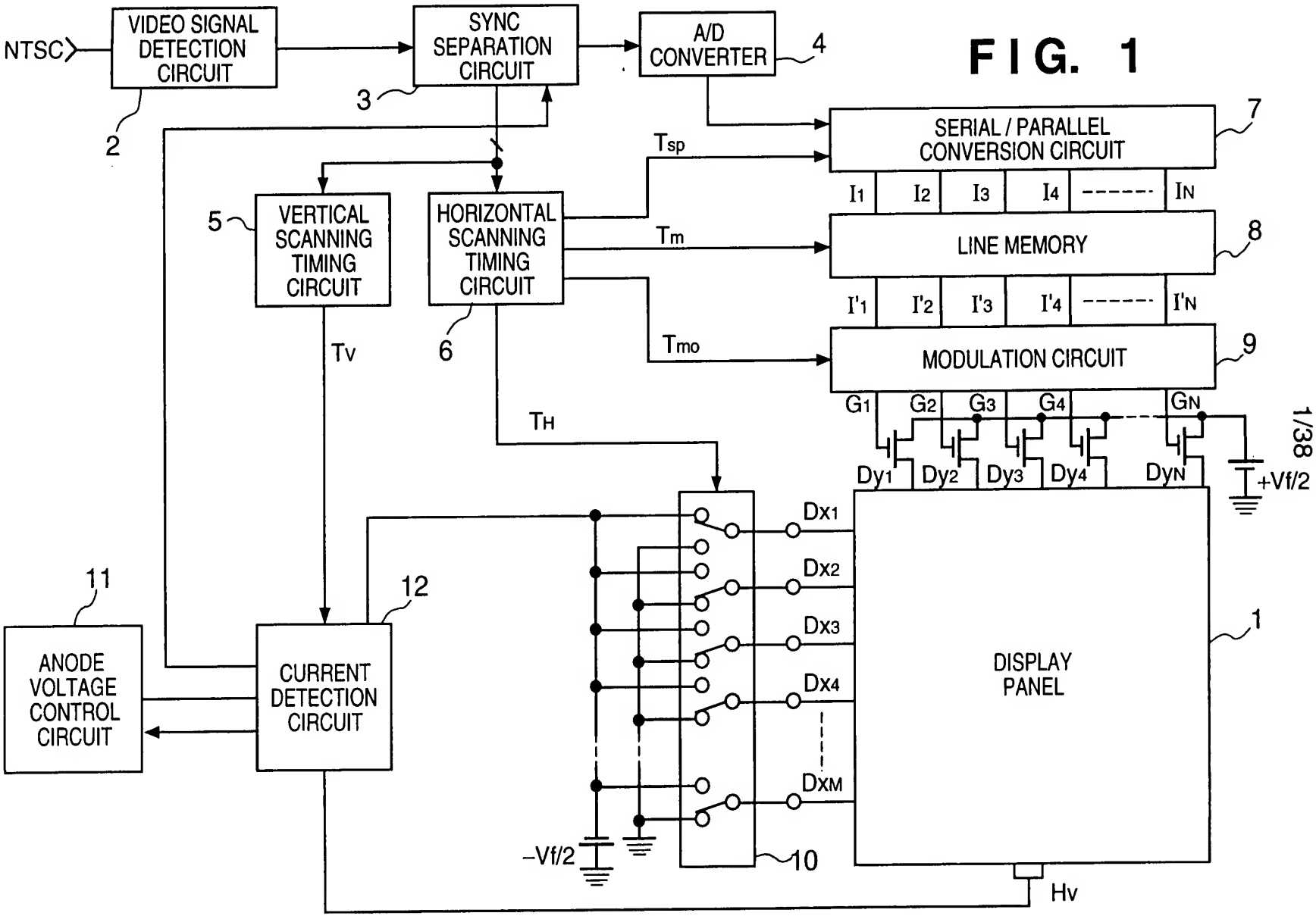

NTSC
VIDEO SIGNAL DETECTION CIRCUIT
2
SYNC SEPARATION CIRCUIT
3
A/D CONVERTER
4
SERIAL / PARALLEL CONVERSION CIRCUIT
7
I1 I2 I3 I4 ------ IN
LINE MEMORY
8
I'1 I'2 I'3 I'4 ------ I'N
MODULATION CIRCUIT
9
5
VERTICAL SCANNING TIMING CIRCUIT
HORIZONTAL SCANNING TIMING CIRCUIT
6
Tsp
Tm
Tmo
Tv
TH
G1 G2 G3 G4 GN
Dy1 Dy2 Dy3 Dy4 DyN
+Vf/2
Dx1
Dx2
Dx3
Dx4
DxM
DISPLAY PANEL
1
11
ANODE VOLTAGE CONTROL CIRCUIT
12
CURRENT DETECTION CIRCUIT
-Vf/2
10
Hv
1/38

FIG. 1

FIG. 2

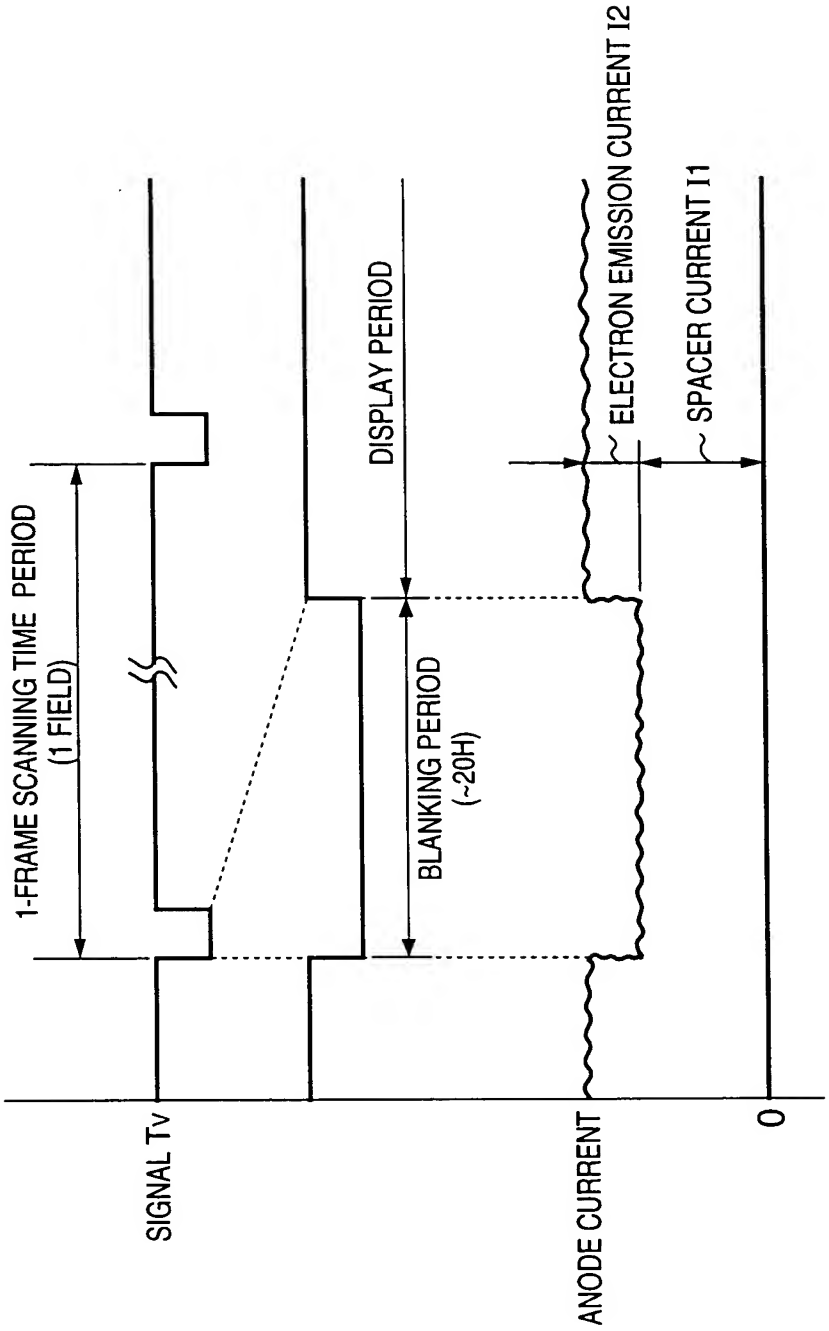
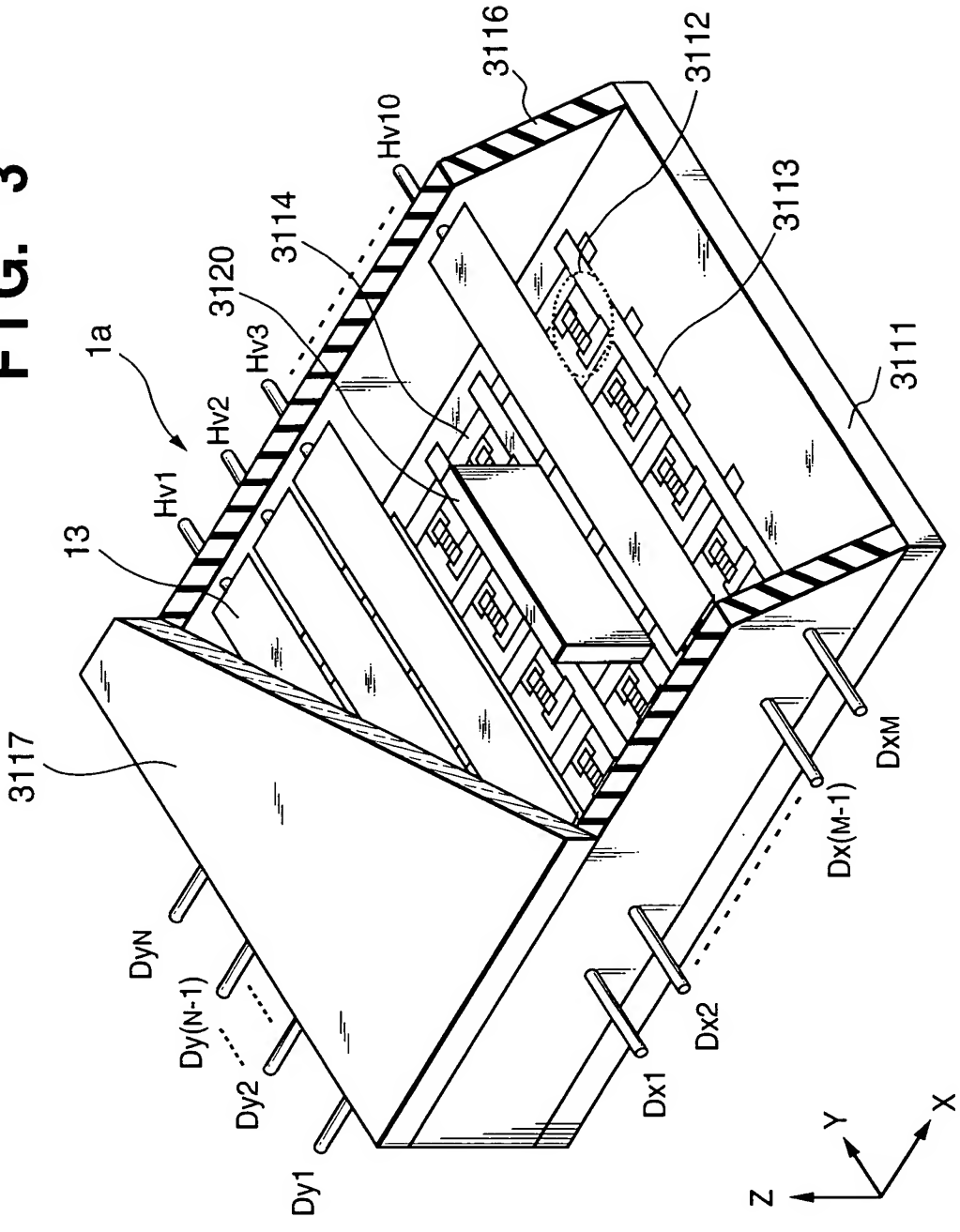

1-FRAME SCANNING TIME PERIOD
(1 FIELD)
DISPLAY PERIOD
BLANKING PERIOD
(~20H)
ELECTRON EMISSION CURRENT I2
SPACER CURRENT I1
SIGNAL Tv
ANODE CURRENT
0

FIG. 3


1a
13
3117
3120
3114
3116
3112
3113
3111
Hv1
Hv2
Hv3
Hv10
DyN
Dy(N-1)
Dy2
Dy1
Dx1
Dx2
Dx(M-1)
DxM
Z
Y
X

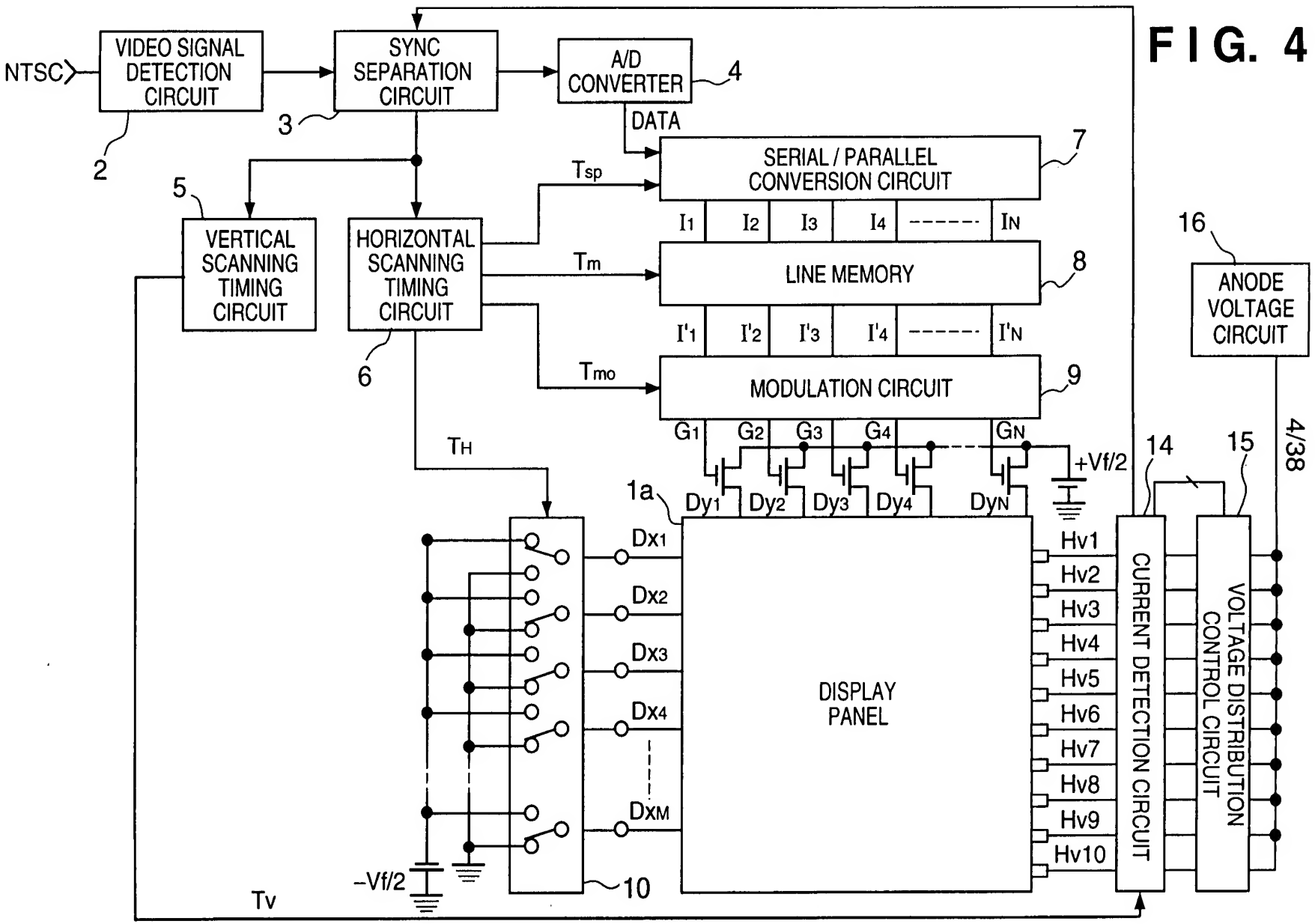
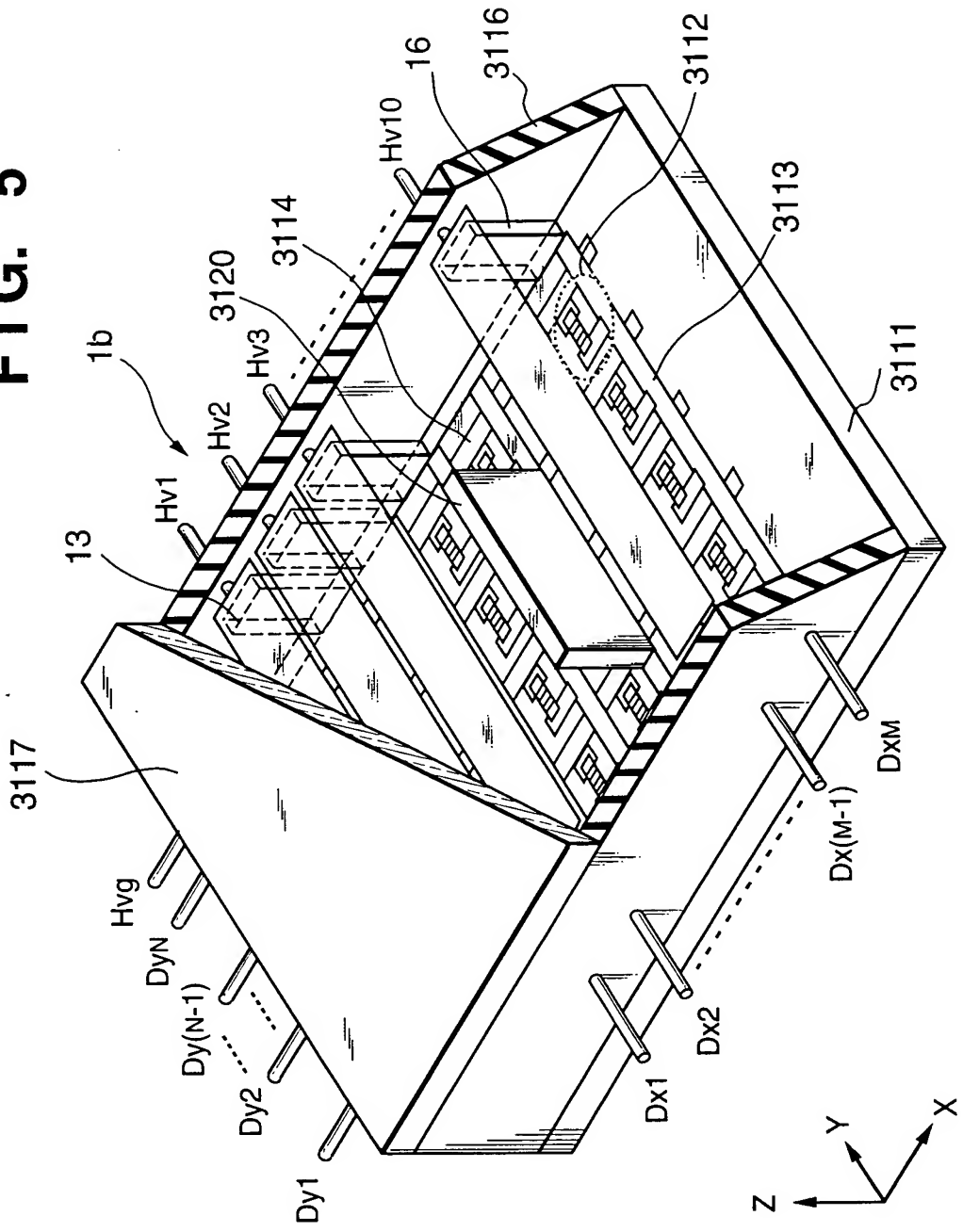

NTSC
VIDEO SIGNAL DETECTION CIRCUIT
2
SYNC SEPARATION CIRCUIT
3
A/D CONVERTER
4
DATA
SERIAL / PARALLEL CONVERSION CIRCUIT
7
Tsp
5
VERTICAL SCANNING TIMING CIRCUIT
HORIZONTAL SCANNING TIMING CIRCUIT
6
Tm
LINE MEMORY
8
I1 I2 I3 I4 ------ IN
I'1 I'2 I'3 I'4 ------ I'N
Tmo
MODULATION CIRCUIT
9
G1 G2 G3 G4 GN
TH
+Vf/2
16
ANODE VOLTAGE CIRCUIT
4/38
14
15
1a
Dy1 Dy2 Dy3 Dy4 DyN
Dx1
Dx2
Dx3
Dx4
DxM
DISPLAY PANEL
Hv1
Hv2
Hv3
Hv4
Hv5
Hv6
Hv7
Hv8
Hv9
Hv10
CURRENT DETECTION CIRCUIT
VOLTAGE DISTRIBUTION CONTROL CIRCUIT
-Vf/2
10
Tv

FIG. 4

FIG. 5


1b
13
3117
Hvg
DyN
Dy(N-1)
Dy2
Dy1
Hv1
Hv2
Hv3
3120
3114
Hv10
16
3116
3112
3113
3111
DxM
Dx(M-1)
Dx2
Dx1
Y
X
Z

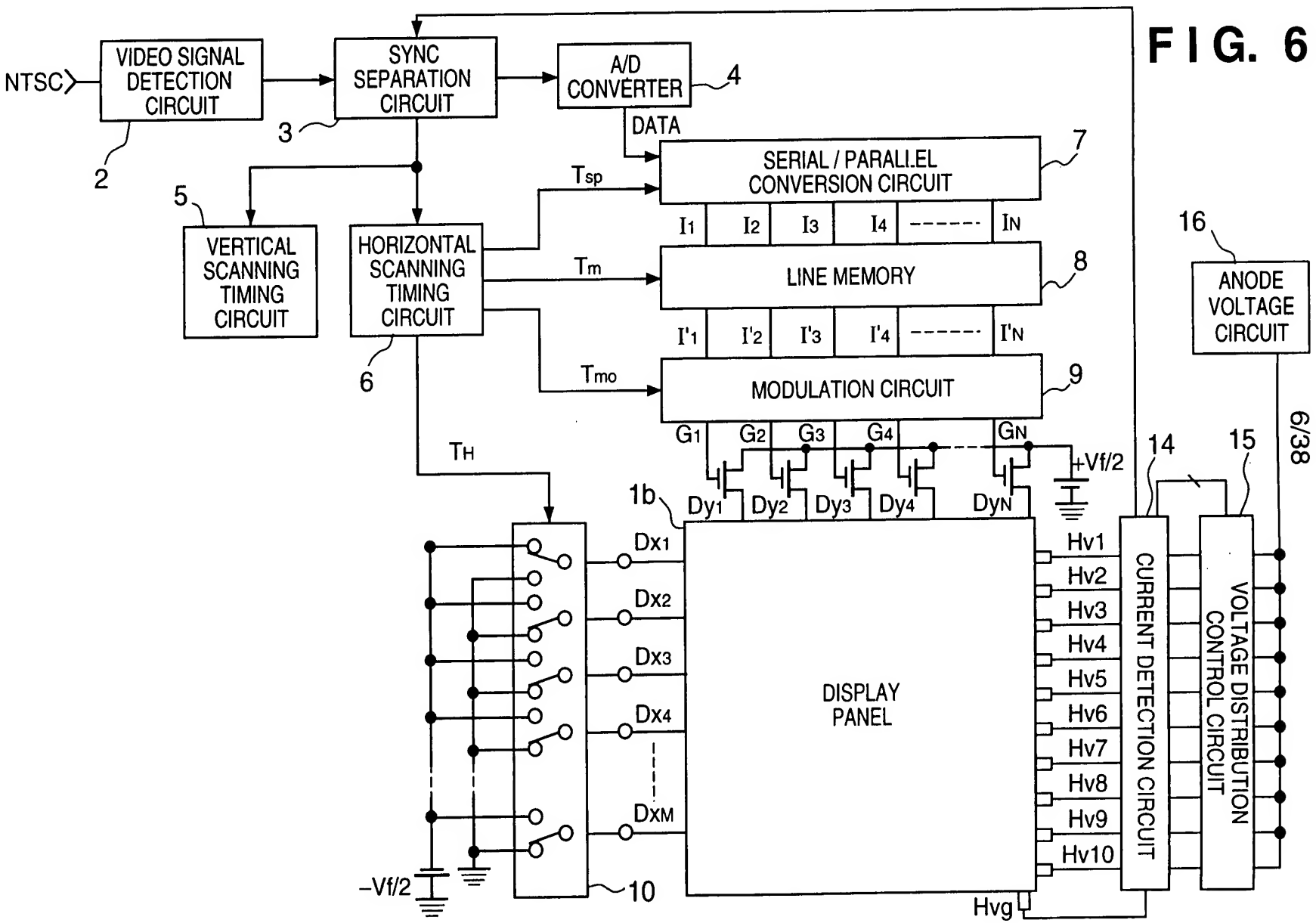

NTSC
VIDEO SIGNAL DETECTION CIRCUIT
2
SYNC SEPARATION CIRCUIT
3
A/D CONVERTER
4
DATA
SERIAL / PARALLEL CONVERSION CIRCUIT
7
5
VERTICAL SCANNING TIMING CIRCUIT
HORIZONTAL SCANNING TIMING CIRCUIT
6
Tsp
Tm
Tmo
TH
I1 I2 I3 I4 ------ IN
LINE MEMORY
8
I'1 I'2 I'3 I'4 ------ I'N
MODULATION CIRCUIT
9
G1 G2 G3 G4 GN
+Vf/2
16
ANODE VOLTAGE CIRCUIT
6/38
14
15
1b
Dy1 Dy2 Dy3 Dy4 DyN
Dx1
Dx2
Dx3
Dx4
DxM
DISPLAY PANEL
Hv1
Hv2
Hv3
Hv4
Hv5
Hv6
Hv7
Hv8
Hv9
Hv10
Hvg
CURRENT DETECTION CIRCUIT
VOLTAGE DISTRIBUTION CONTROL CIRCUIT
-Vf/2
10

FIG. 6

FIG. 7

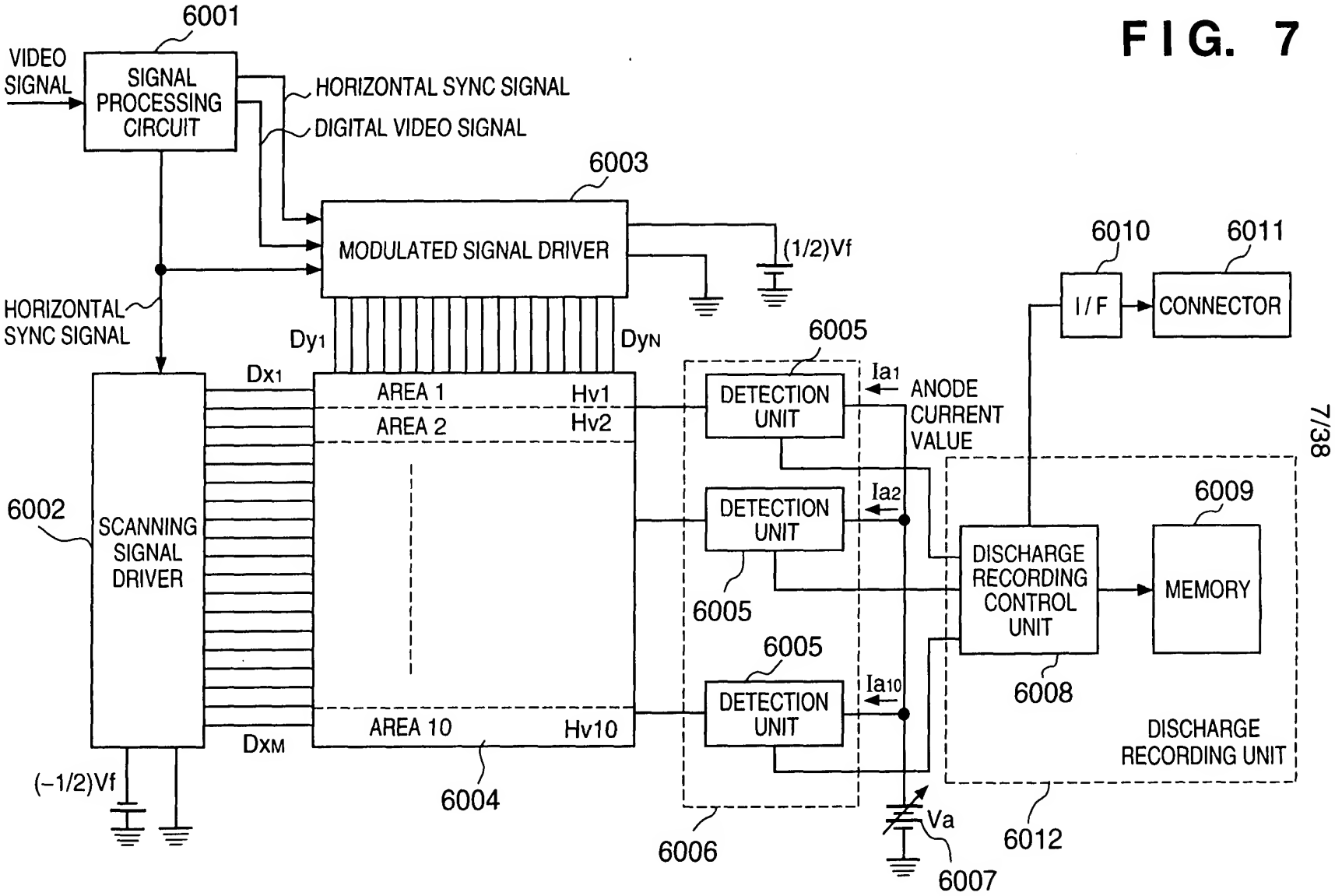

6001
VIDEO SIGNAL
SIGNAL PROCESSING CIRCUIT
HORIZONTAL SYNC SIGNAL
DIGITAL VIDEO SIGNAL
6003
MODULATED SIGNAL DRIVER
(1/2)Vf
6010
6011
I/F
CONNECTOR
HORIZONTAL SYNC SIGNAL
Dy1
DyN
6005
Dx1
AREA 1
Hv1
AREA 2
Hv2
Ia1
ANODE CURRENT VALUE
DETECTION UNIT
6002
SCANNING SIGNAL DRIVER
Ia2
6009
DISCHARGE RECORDING CONTROL UNIT
MEMORY
6005
6005
Ia10
DETECTION UNIT
6008
DxM
AREA 10
Hv10
DISCHARGE RECORDING UNIT
(-1/2)Vf
6004
6006
Va
6012
6007

FIG. 8

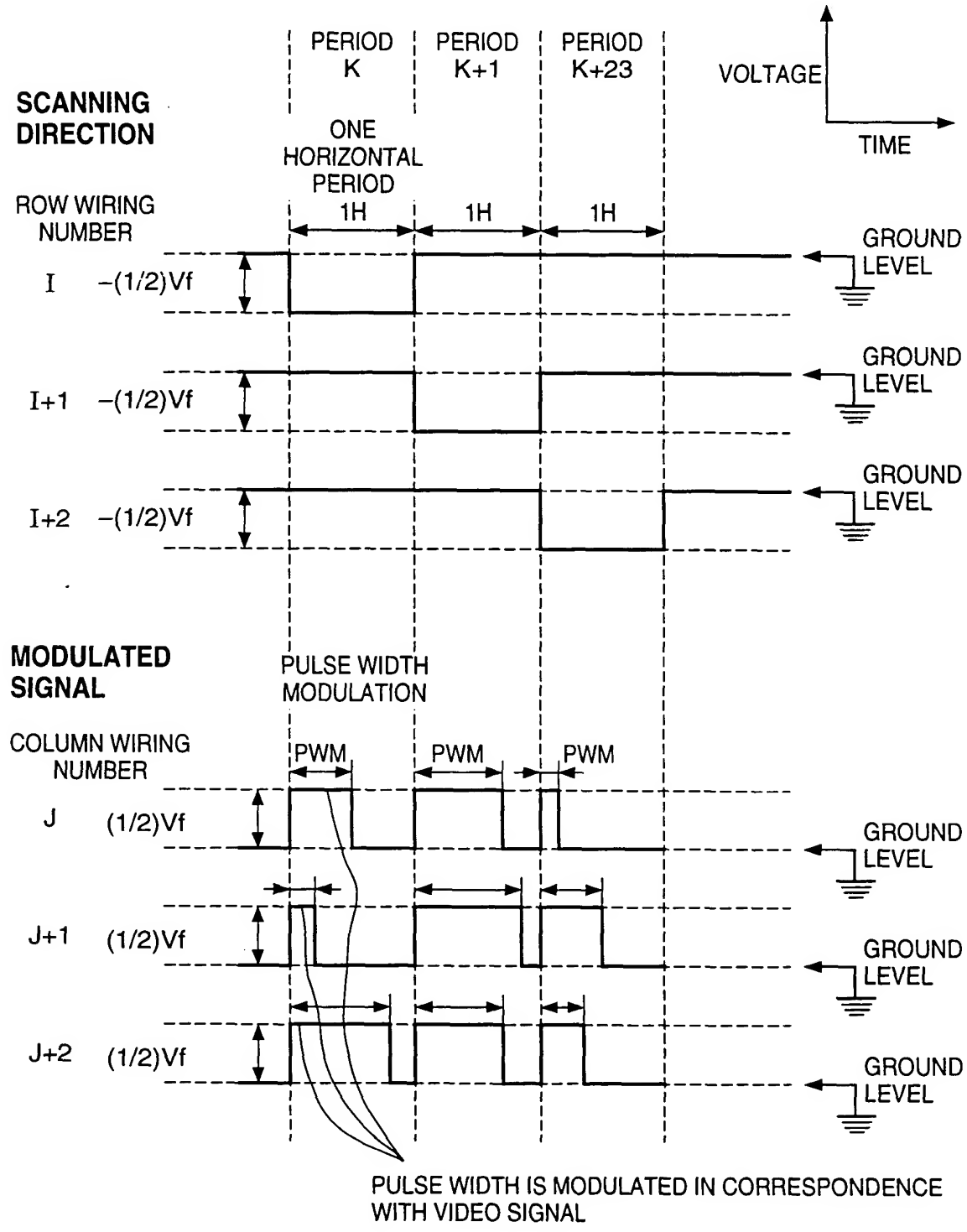

PERIOD K
PERIOD K+1
PERIOD K+23
VOLTAGE
TIME
SCANNING DIRECTION
ONE HORIZONTAL PERIOD
1H
1H
1H
ROW WIRING NUMBER
I
−(1/2)Vf
I+1
−(1/2)Vf
I+2
−(1/2)Vf
GROUND LEVEL
GROUND LEVEL
GROUND LEVEL
MODULATED SIGNAL
PULSE WIDTH MODULATION
COLUMN WIRING NUMBER
PWM
PWM
PWM
J
(1/2)Vf
J+1
(1/2)Vf
J+2
(1/2)Vf
GROUND LEVEL
GROUND LEVEL
GROUND LEVEL
PULSE WIDTH IS MODULATED IN CORRESPONDENCE WITH VIDEO SIGNAL

FIG. 9

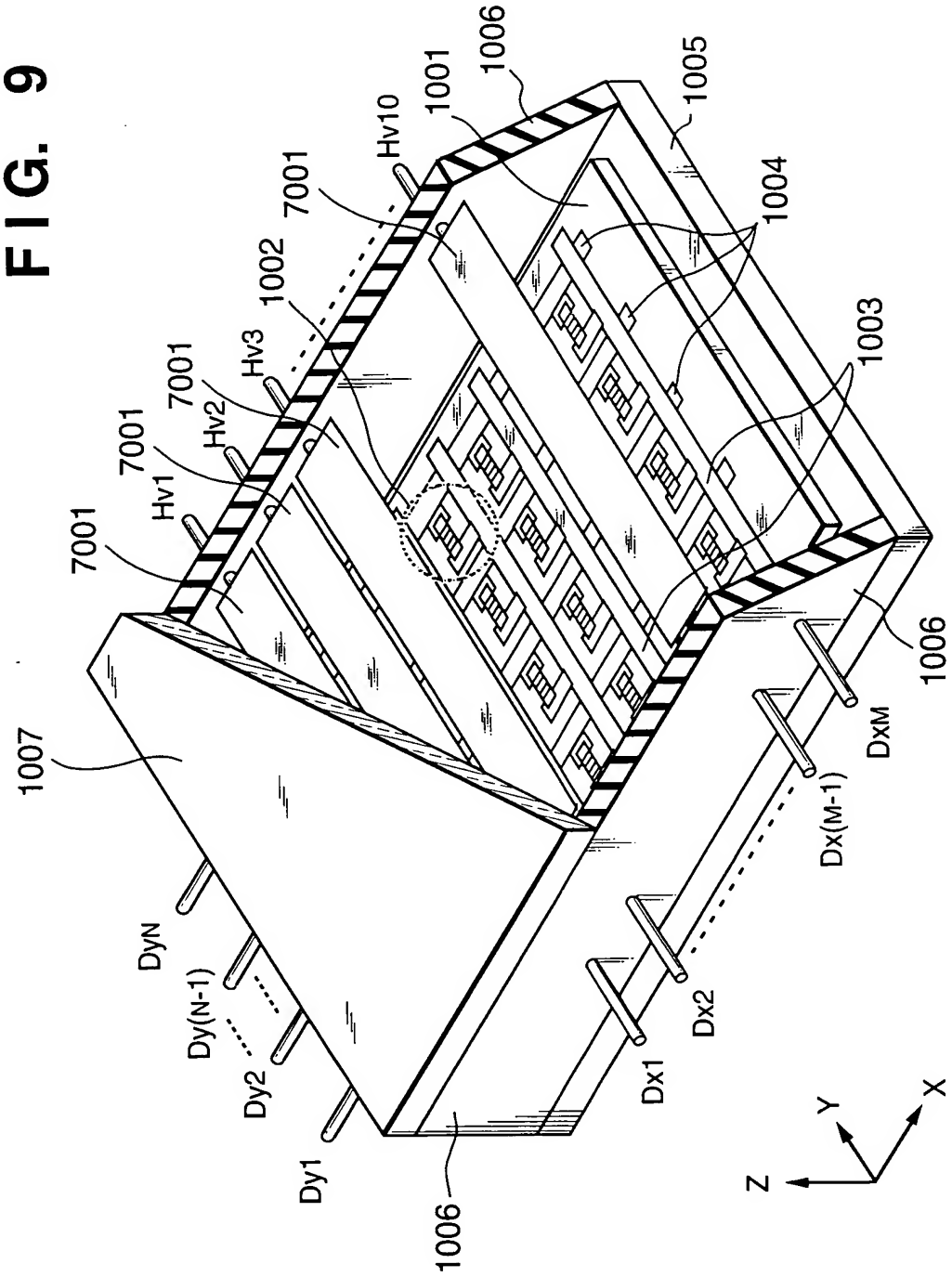

1007
7001
Hv1
7001
Hv2
7001
Hv3
1002
7001
Hv10
1001
1006
1005
1004
1003
1006
DxM
Dx(M-1)
Dx2
Dx1
DyN
Dy(N-1)
Dy2
Dy1
1006
Z
Y
X

FIG. 10

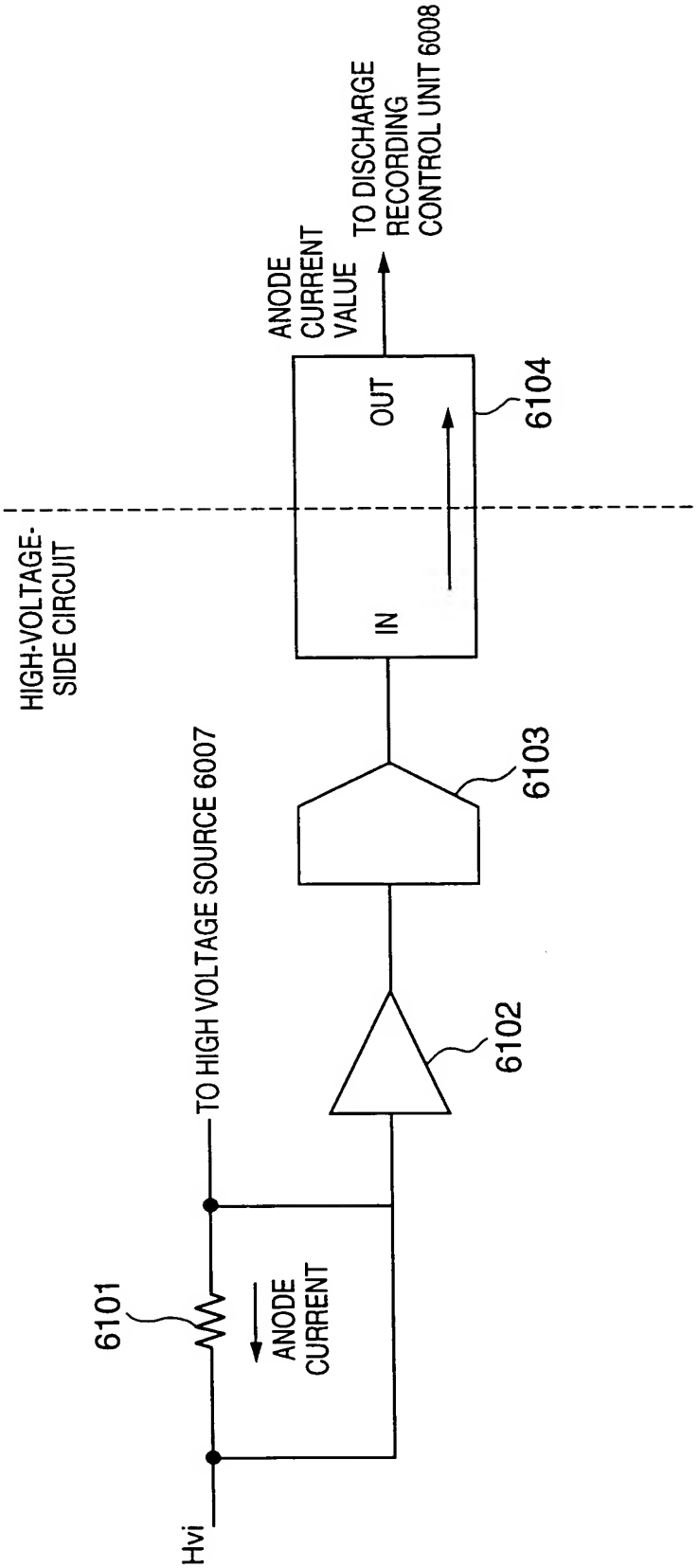

HIGH-VOLTAGE-SIDE CIRCUIT
Hvi
6101
ANODE CURRENT
TO HIGH VOLTAGE SOURCE 6007
6102
6103
IN
OUT
6104
ANODE CURRENT VALUE
TO DISCHARGE RECORDING CONTROL UNIT 6008

FIG. 11

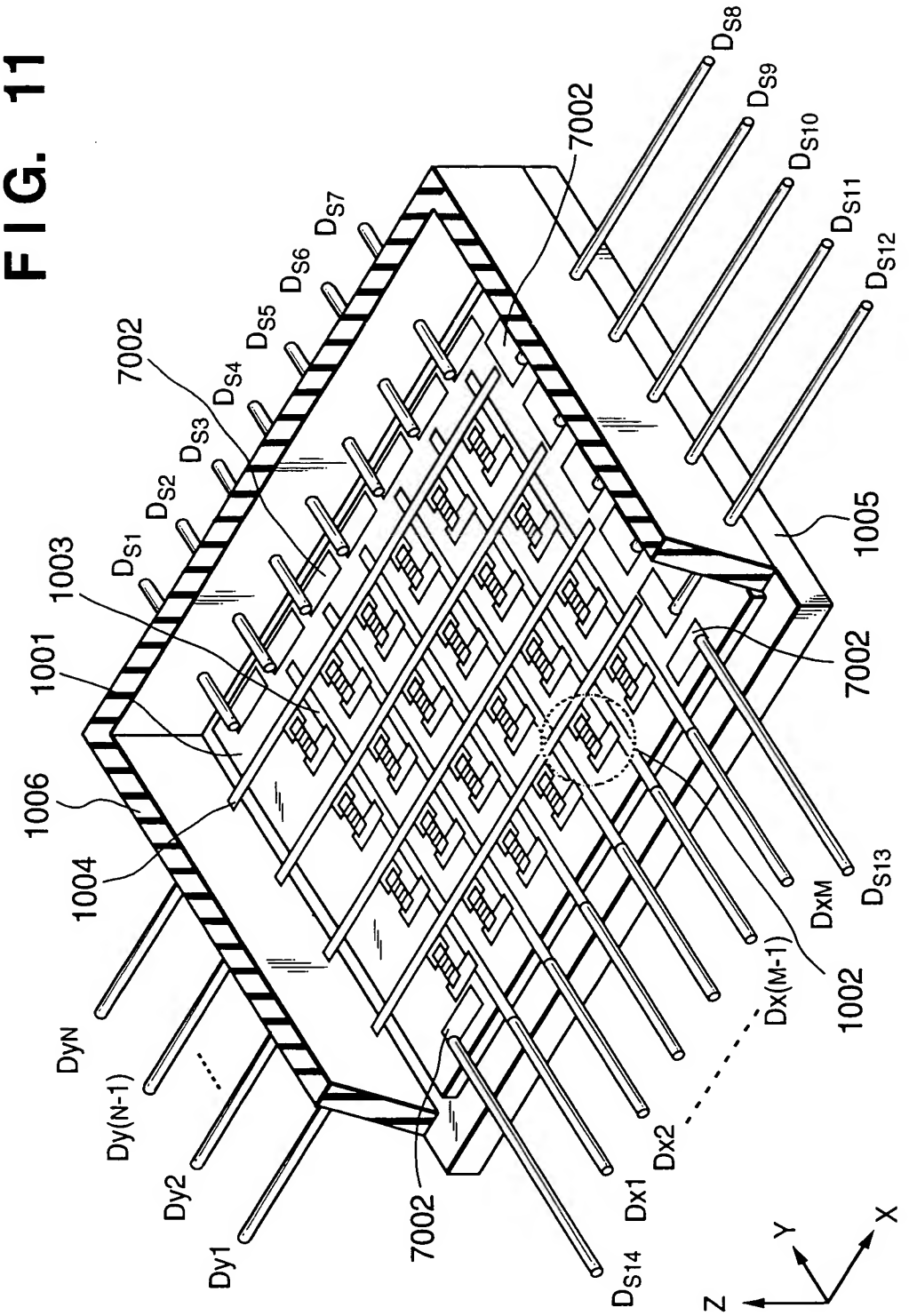

DyN
Dy(N-1)
Dy2
Dy1
1006
1004
1001
1003
DS1
DS2
DS3
DS4
DS5
DS6
DS7
7002
7002
7002
DS8
DS9
DS10
DS11
DS12
DS13
1005
7002
DxM
Dx(M-1)
1002
Dx2
Dx1
DS14
Z
Y
X

FIG. 12

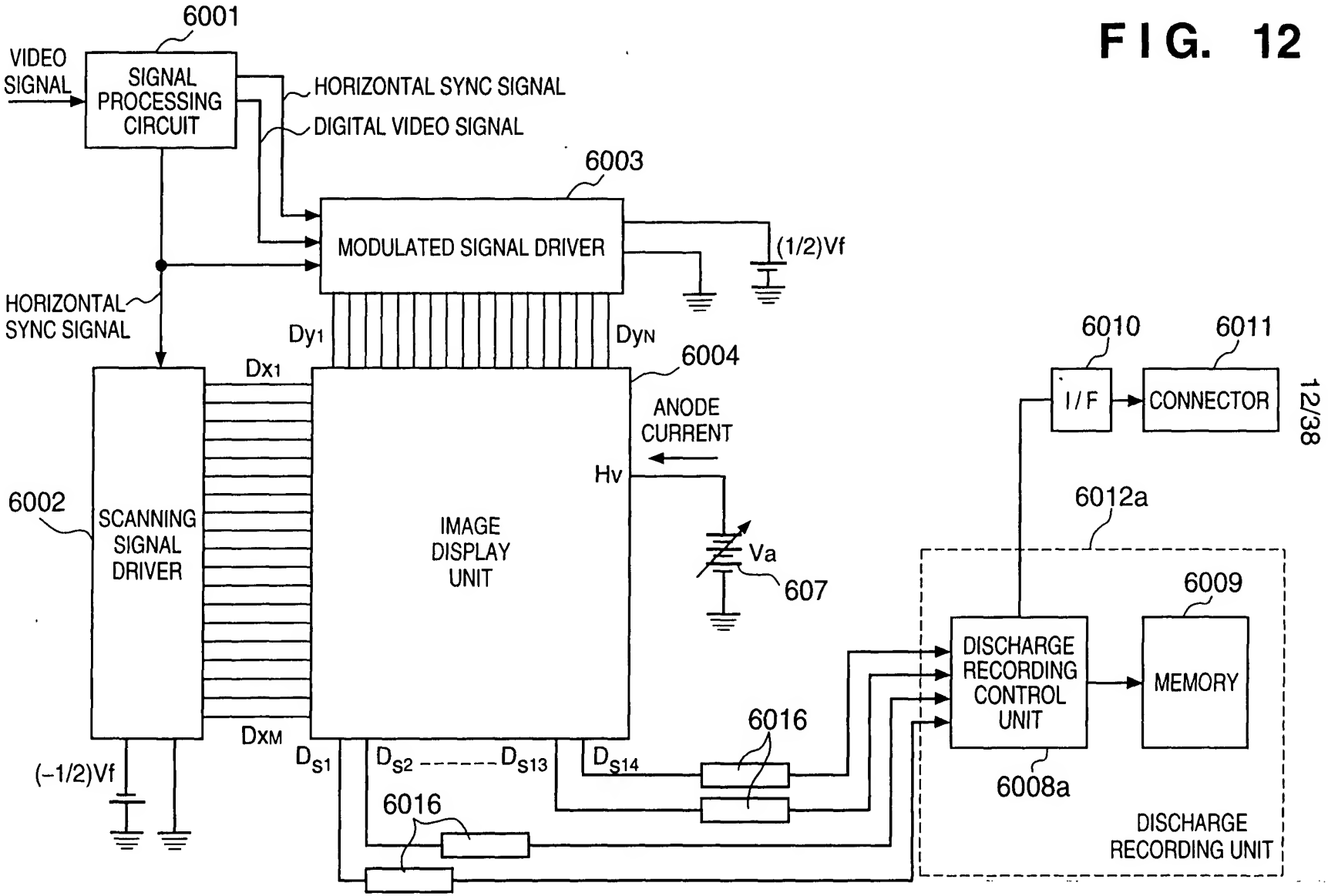

6001
VIDEO SIGNAL
SIGNAL PROCESSING CIRCUIT
HORIZONTAL SYNC SIGNAL
DIGITAL VIDEO SIGNAL
6003
MODULATED SIGNAL DRIVER
(1/2)Vf
HORIZONTAL SYNC SIGNAL
Dy1
DyN
6004
Dx1
ANODE CURRENT
Hv
6002
SCANNING SIGNAL DRIVER
IMAGE DISPLAY UNIT
Va
607
DxM
DS1
DS2 ------ DS13
DS14
6016
6016
(-1/2)Vf
6010
6011
I/F
CONNECTOR
6012a
6009
DISCHARGE RECORDING CONTROL UNIT
MEMORY
6008a
DISCHARGE RECORDING UNIT

FIG. 13

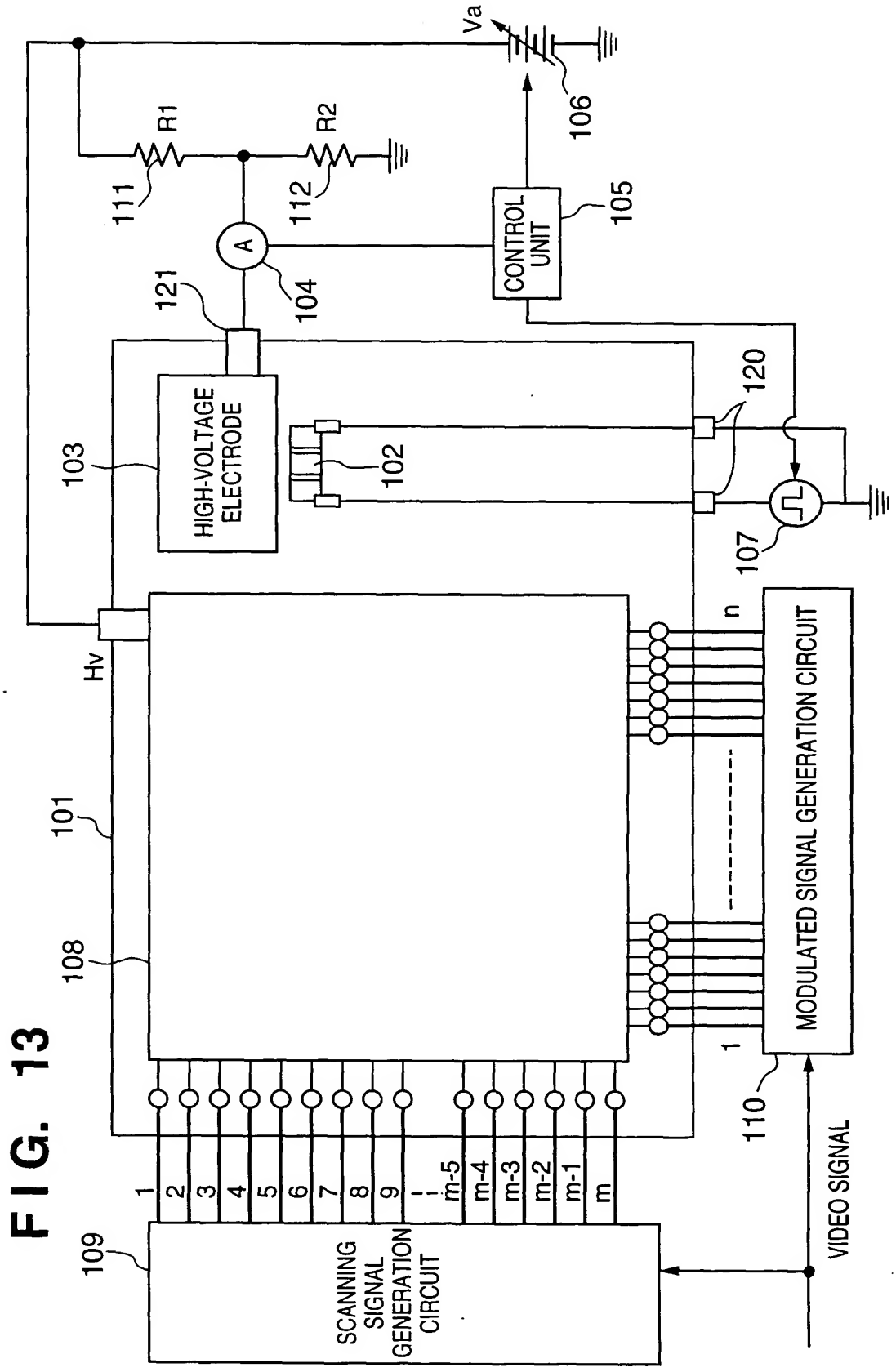

Va
106
R1
R2
111
112
105
CONTROL UNIT
A
104
121
HIGH-VOLTAGE ELECTRODE
103
102
120
107
Hv
101
108
n
1
MODULATED SIGNAL GENERATION CIRCUIT
110
VIDEO SIGNAL
1
2
3
4
5
6
7
8
9
m-5
m-4
m-3
m-2
m-1
m
109
SCANNING SIGNAL GENERATION CIRCUIT

FIG. 14

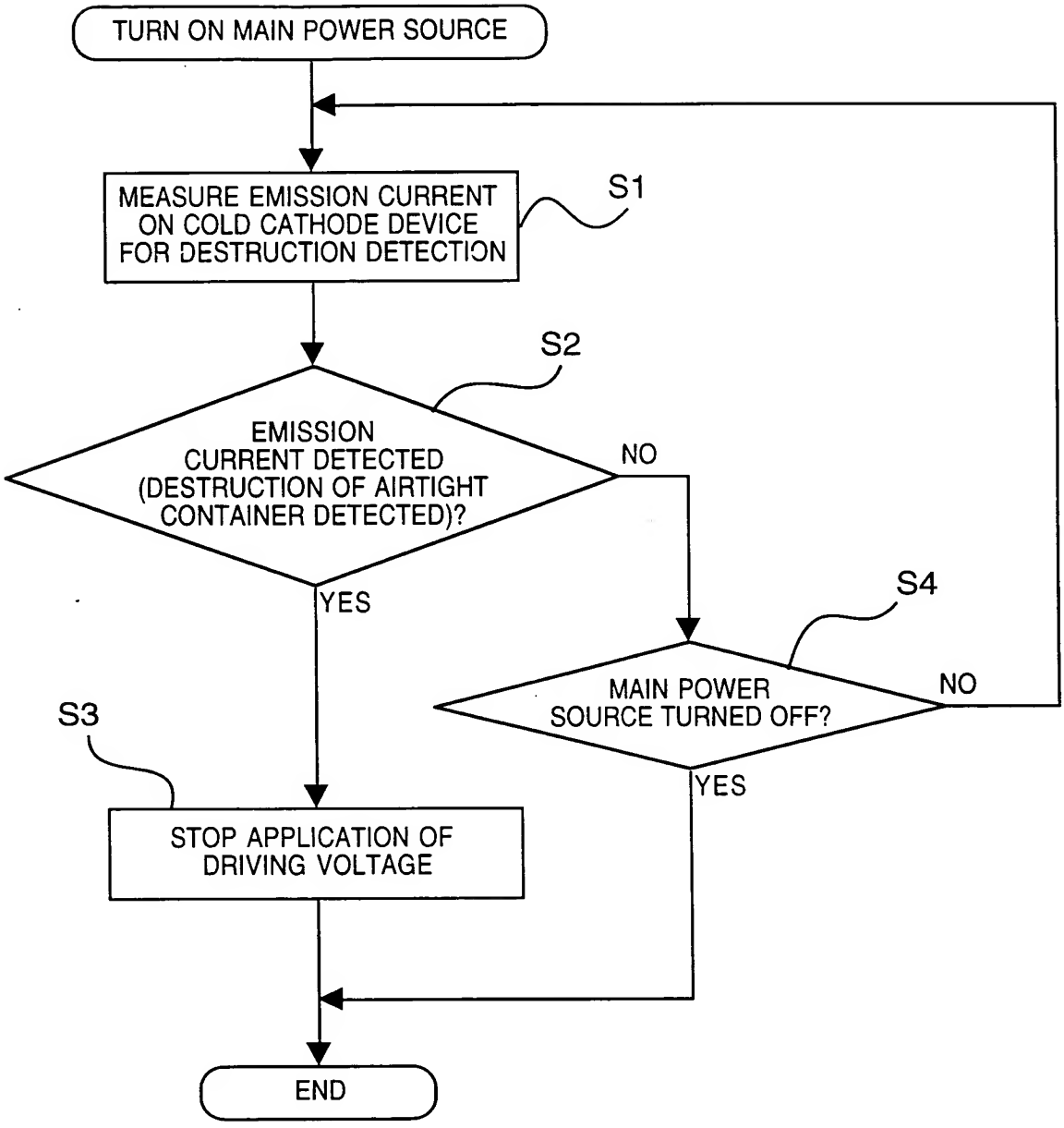

TURN ON MAIN POWER SOURCE
MEASURE EMISSION CURRENT ON COLD CATHODE DEVICE FOR DESTRUCTION DETECTION
S1
S2
EMISSION CURRENT DETECTED (DESTRUCTION OF AIRTIGHT CONTAINER DETECTED)?
NO
YES
S4
MAIN POWER SOURCE TURNED OFF?
NO
YES
S3
STOP APPLICATION OF DRIVING VOLTAGE
END

FIG. 15

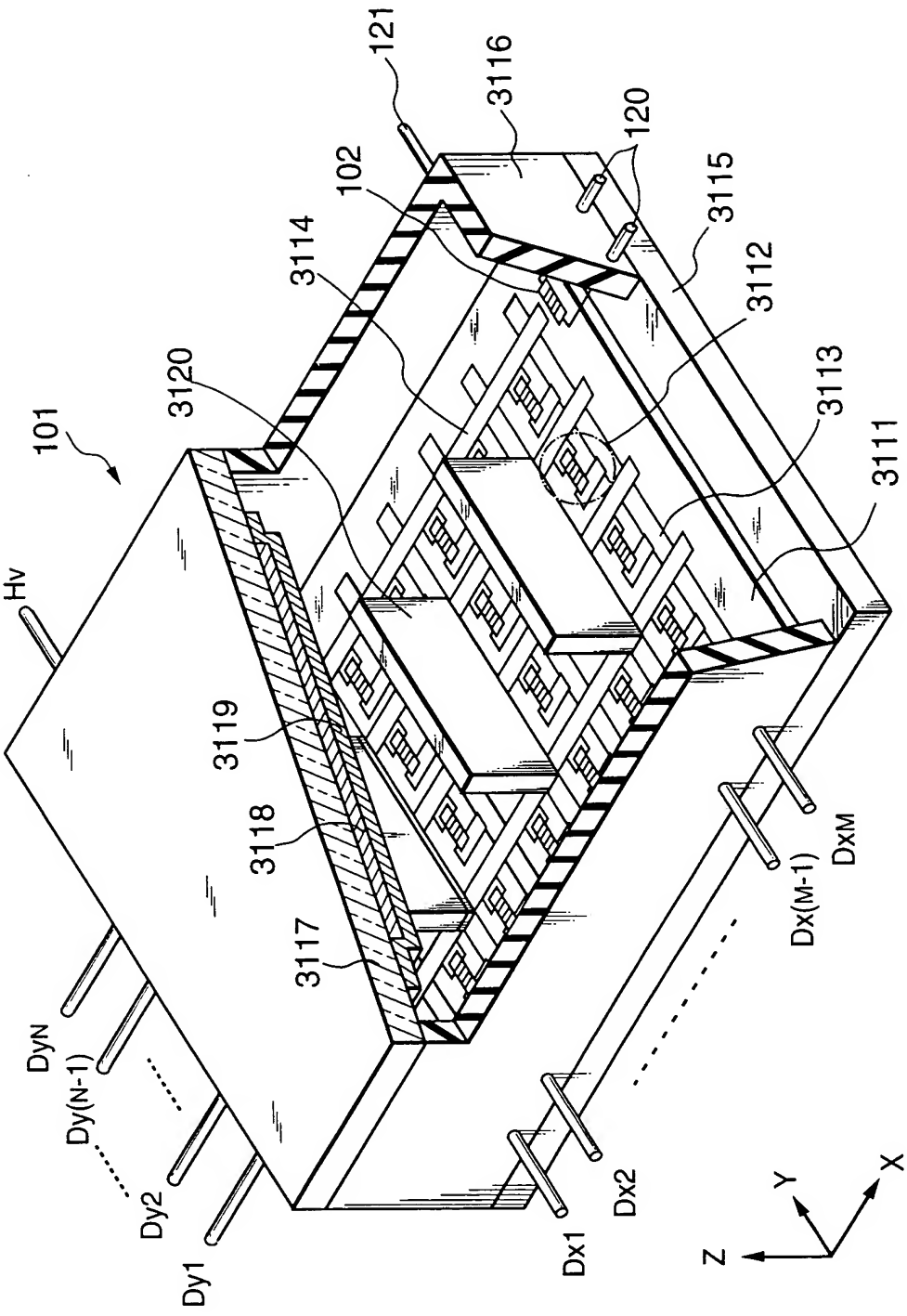

121
3116
120
102
3115
3114
3112
3120
3113
101
3111
Hv
3119
3118
3117
DyN
Dy(N-1)
Dy2
Dy1
Dx1
Dx2
Dx(M-1)
DxM
Z
Y
X

FIG. 16

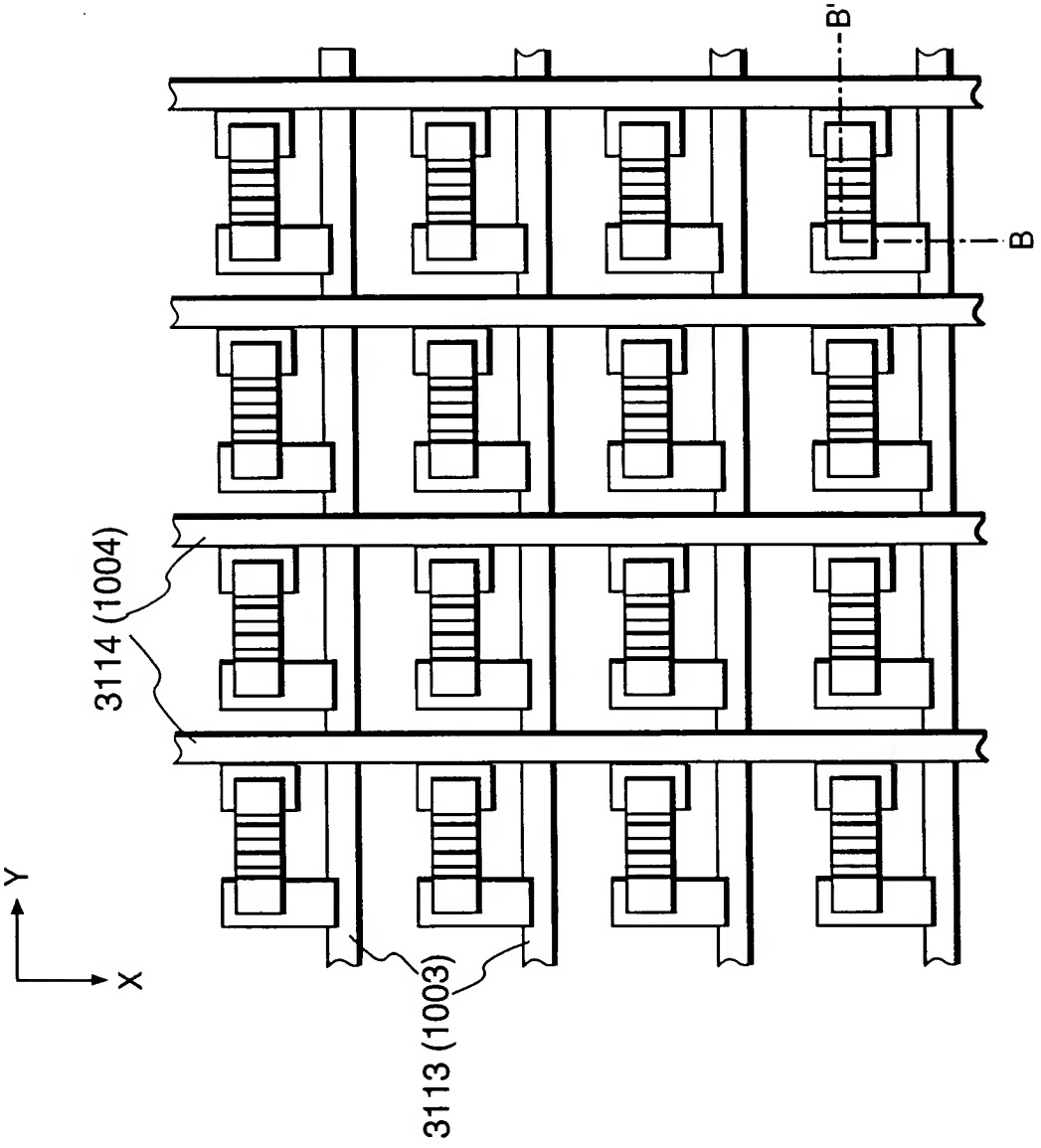


FIG. 17

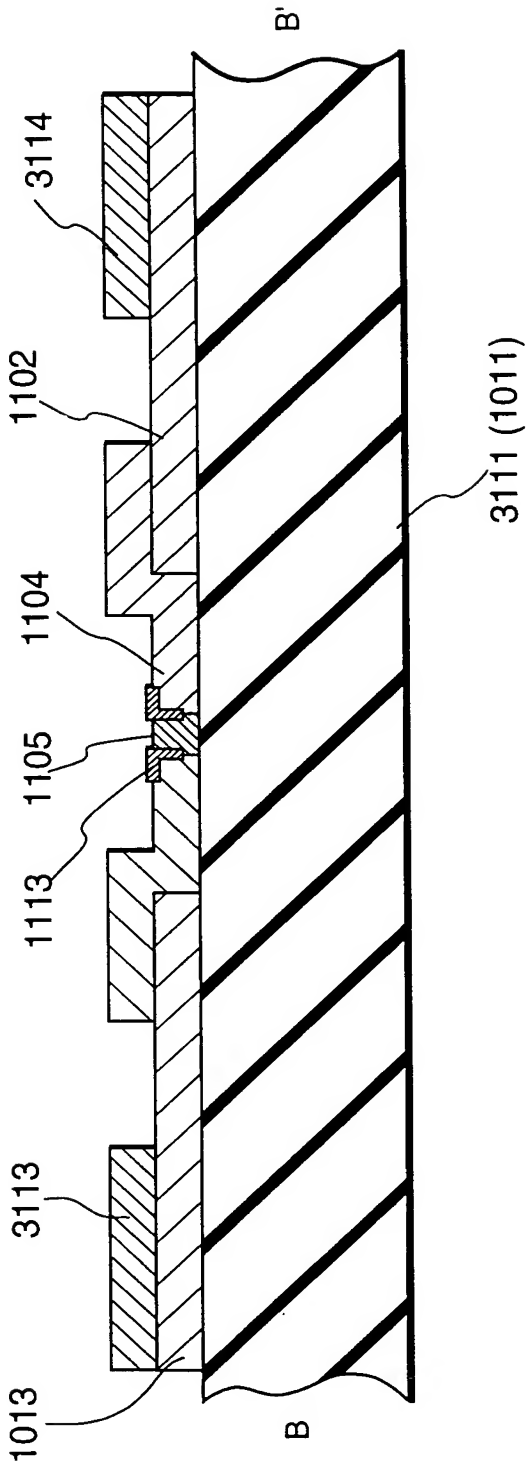


FIG. 18A

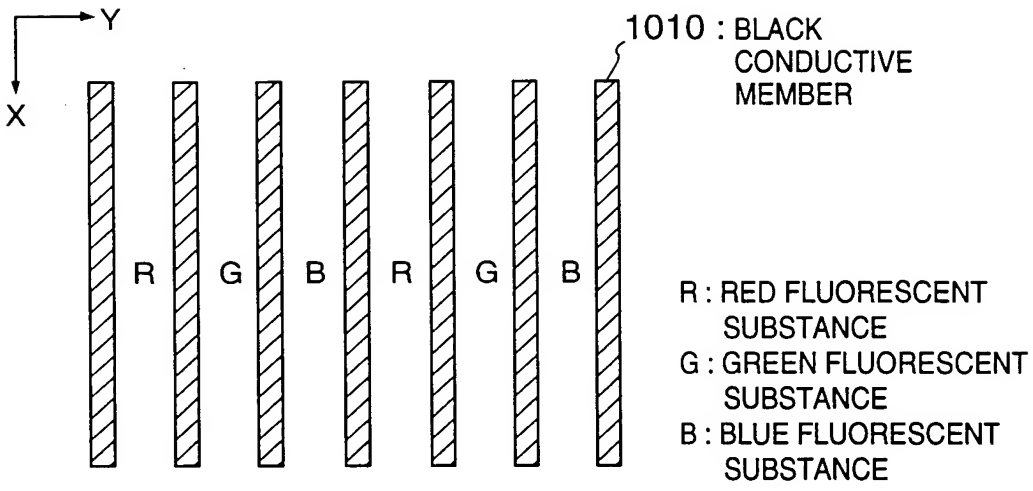


FIG. 18B

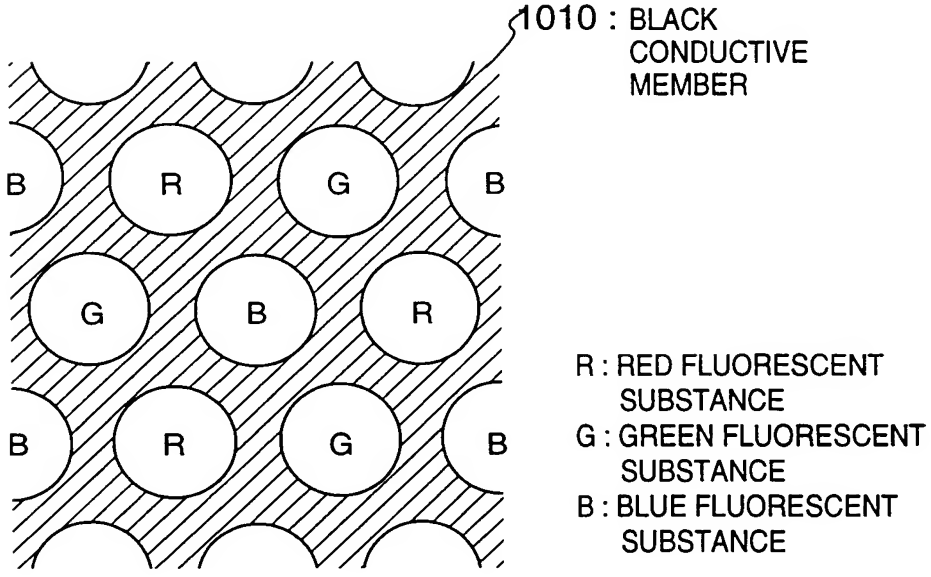


FIG. 19A

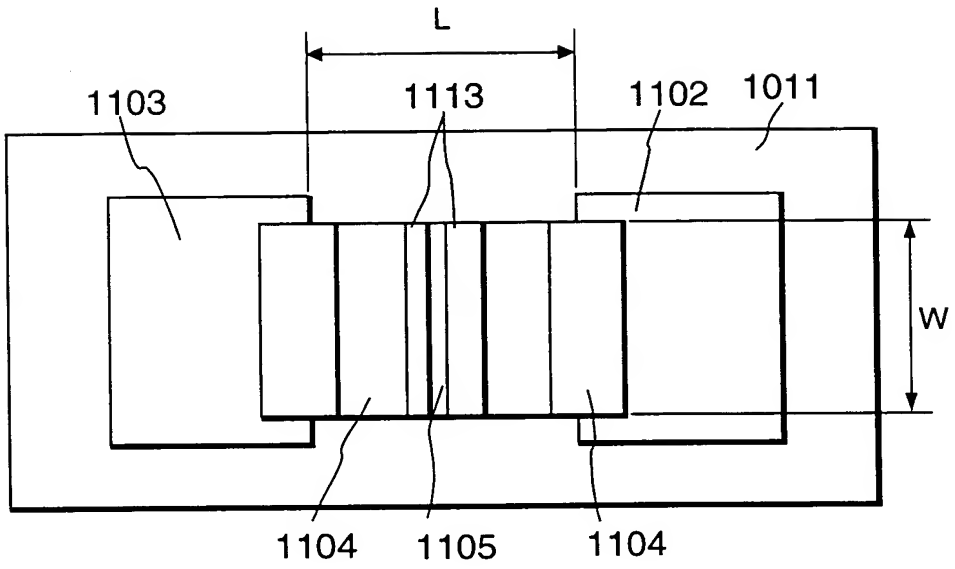


FIG. 19B

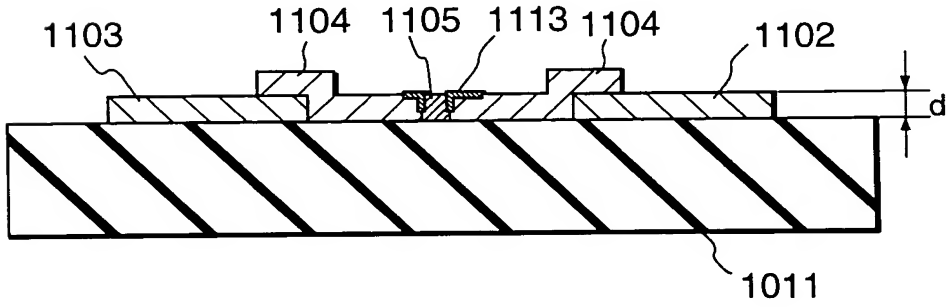


FIG. 20A

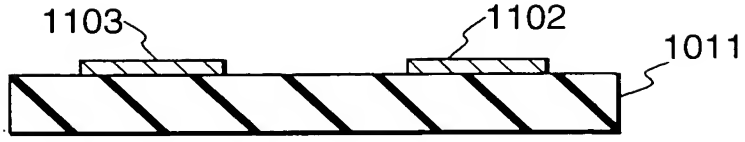


FIG. 20B

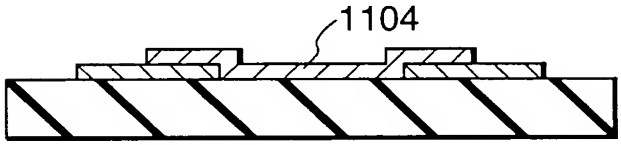


FIG. 20C

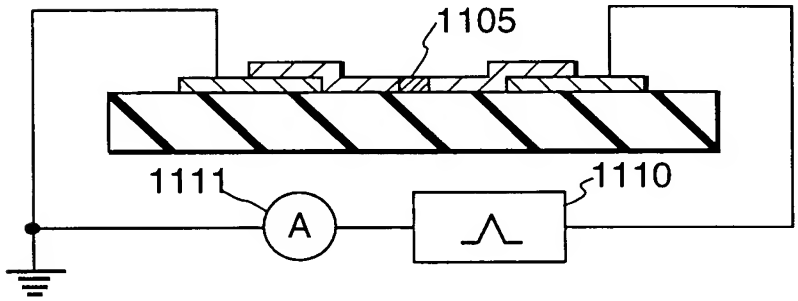


FIG. 20D

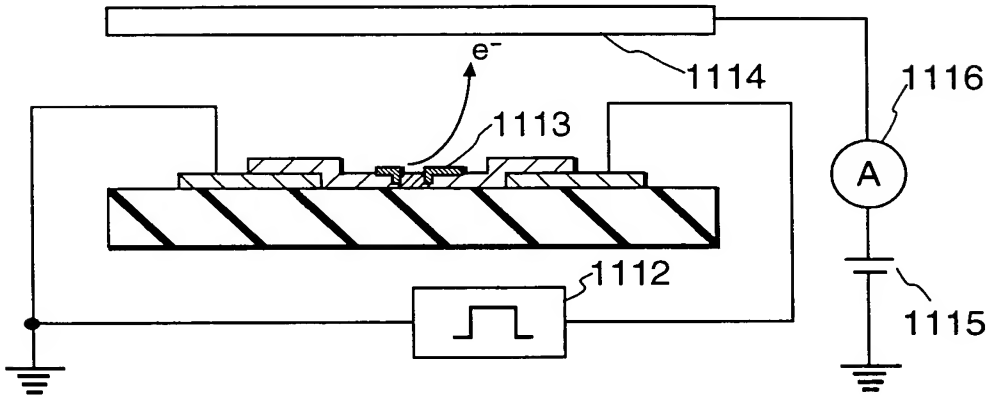


FIG. 20E

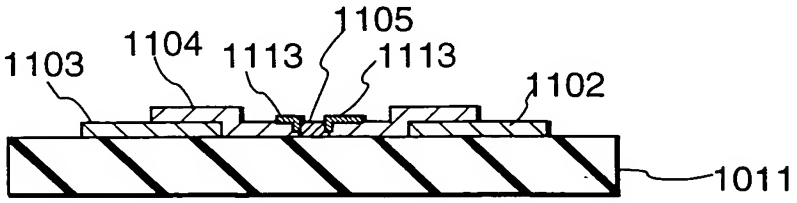


FIG. 21

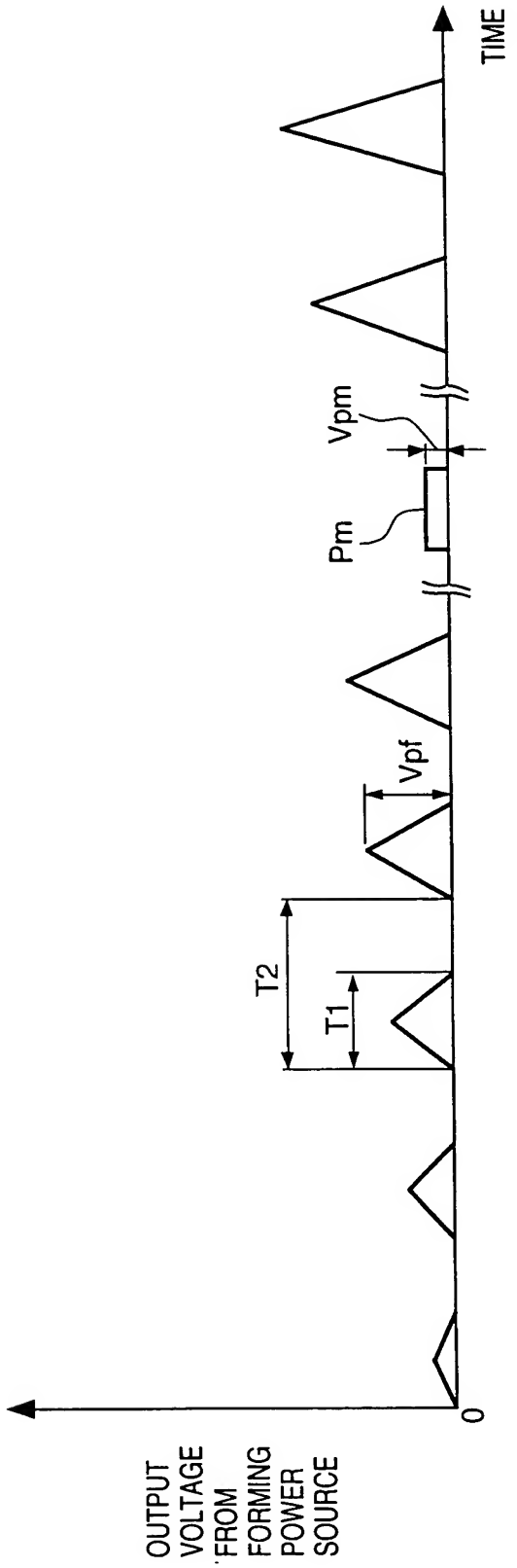

OUTPUT VOLTAGE FROM FORMING POWER SOURCE
0
TIME
T1
T2
Vpf
Pm
Vpm

FIG. 22A

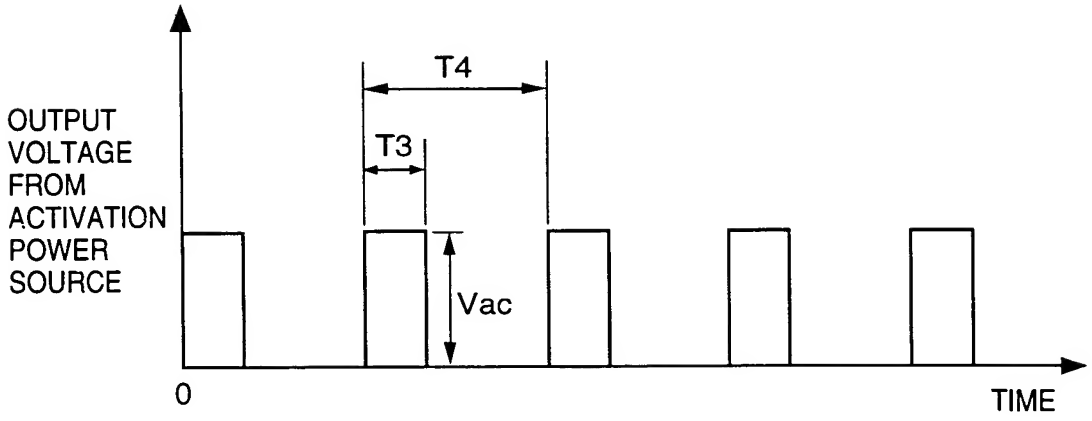


FIG. 22B

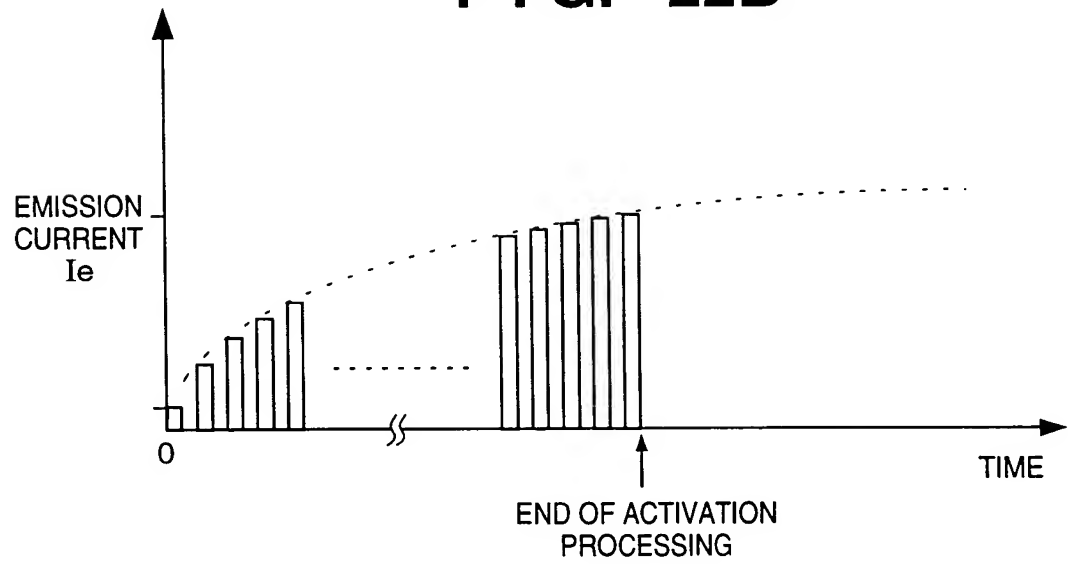


FIG. 23

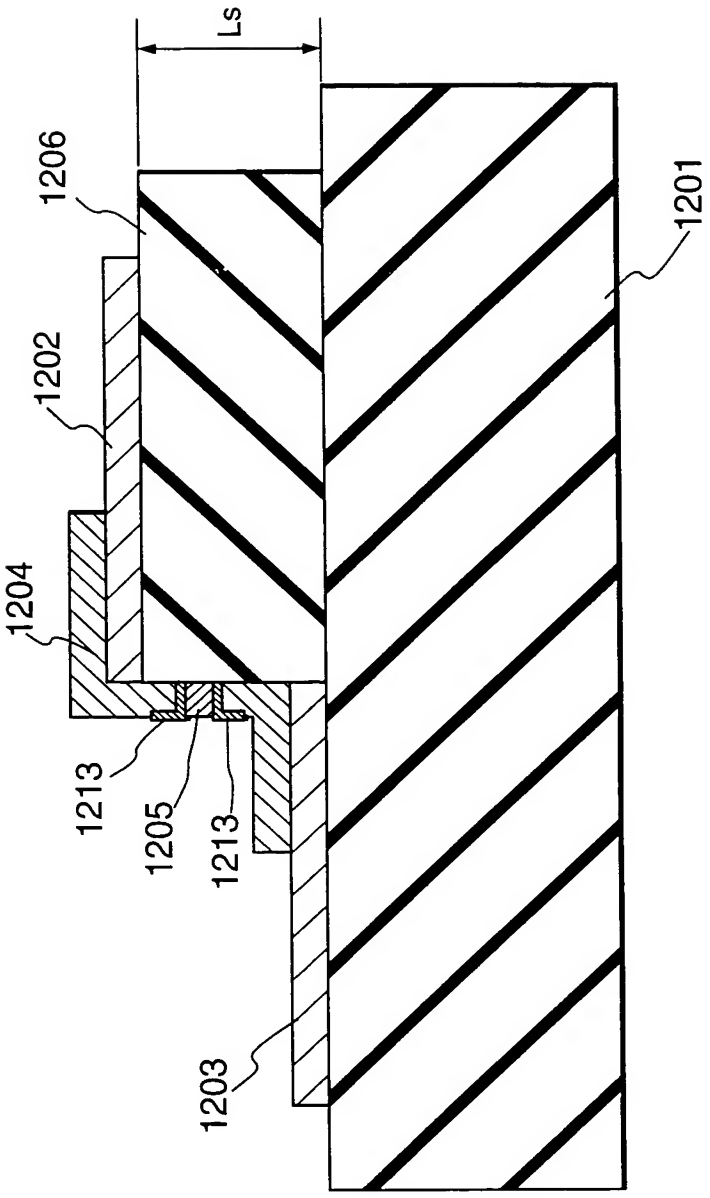


FIG. 24A

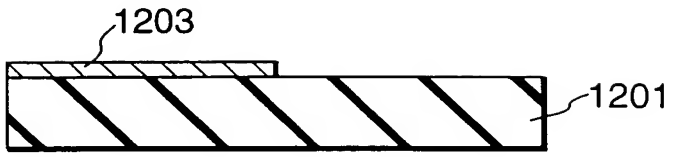


FIG. 24B

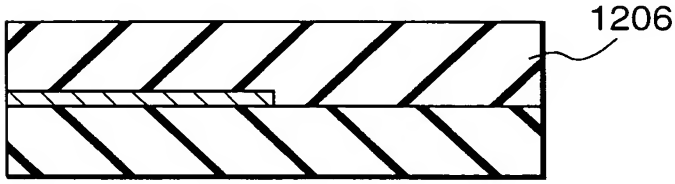


FIG. 24C

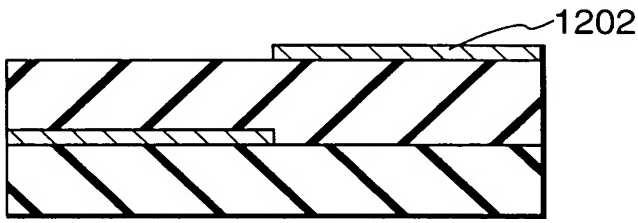


FIG. 24D

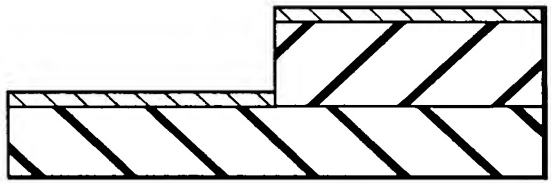


FIG. 24E

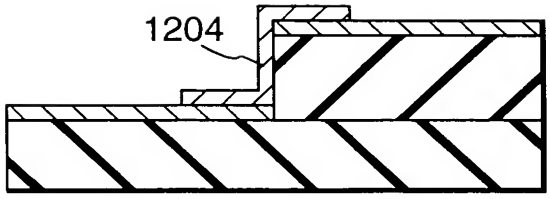


FIG. 24F

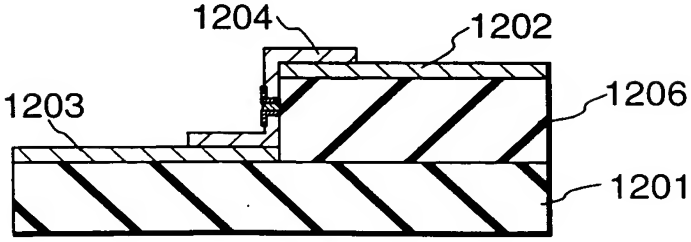


FIG. 25

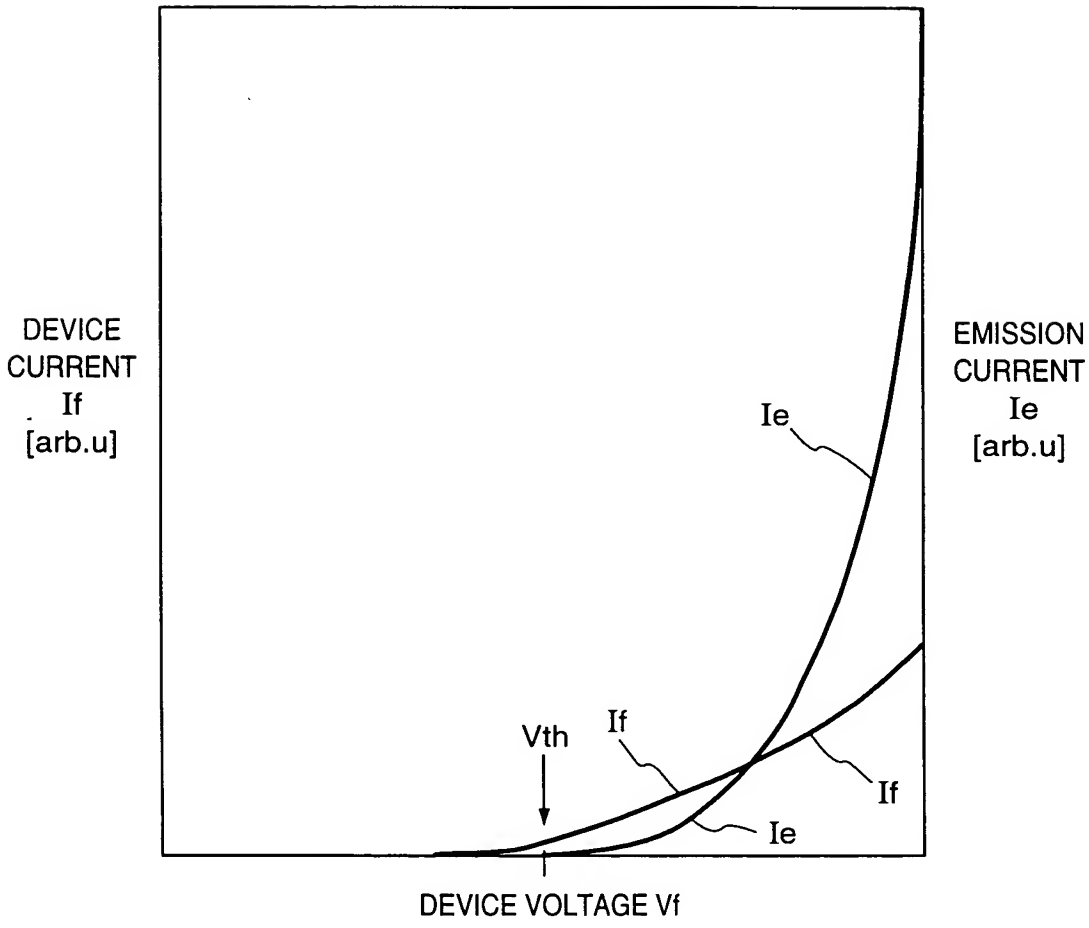

DEVICE
CURRENT
If
[arb.u]
EMISSION
CURRENT
Ie
[arb.u]
Ie
Vth
If
If
Ie
DEVICE VOLTAGE Vf

FIG. 26

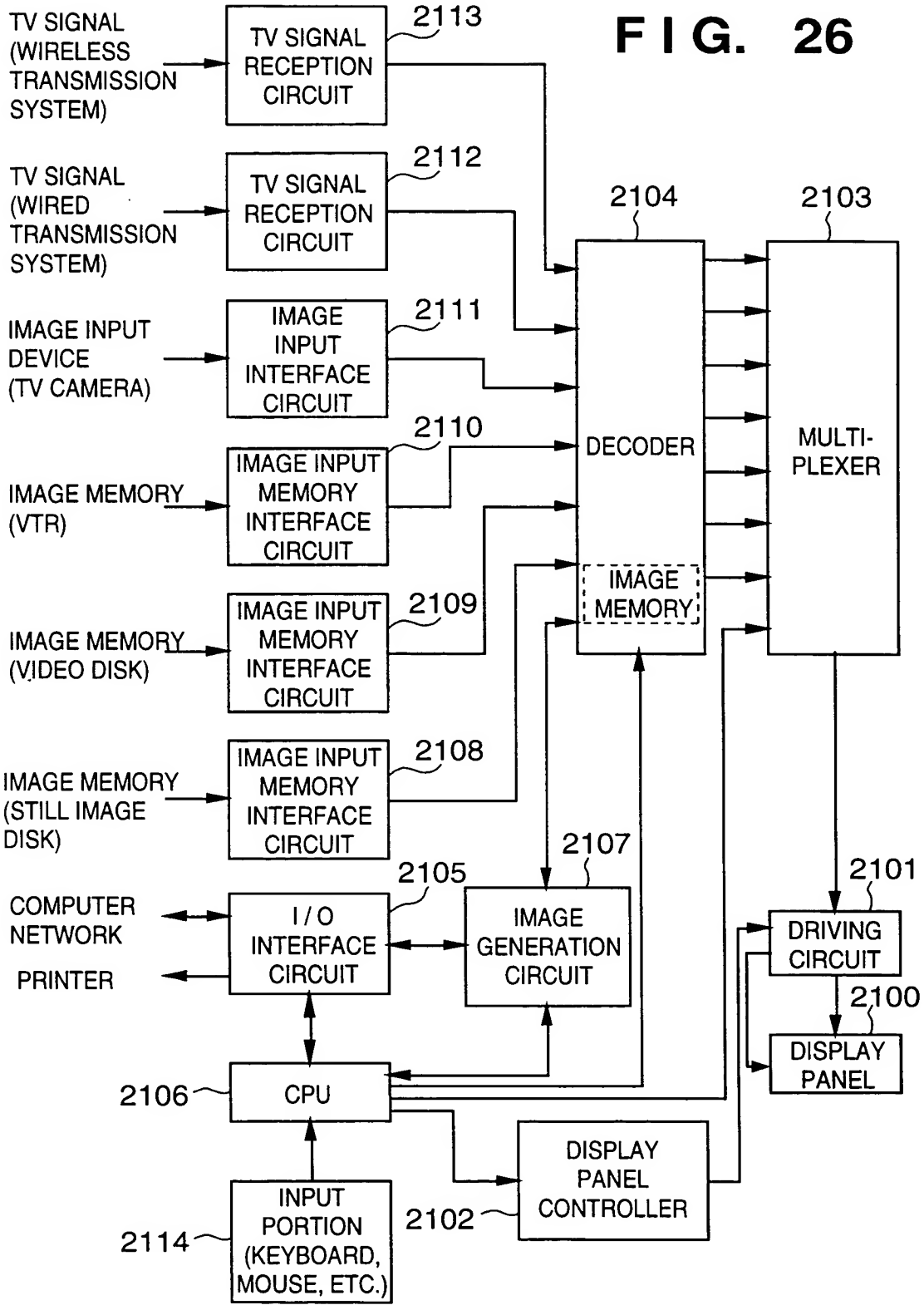

TV SIGNAL (WIRELESS TRANSMISSION SYSTEM)
TV SIGNAL RECEPTION CIRCUIT
2113
TV SIGNAL (WIRED TRANSMISSION SYSTEM)
TV SIGNAL RECEPTION CIRCUIT
2112
IMAGE INPUT DEVICE (TV CAMERA)
IMAGE INPUT INTERFACE CIRCUIT
2111
IMAGE MEMORY (VTR)
IMAGE INPUT MEMORY INTERFACE CIRCUIT
2110
IMAGE MEMORY (VIDEO DISK)
IMAGE INPUT MEMORY INTERFACE CIRCUIT
2109
IMAGE MEMORY (STILL IMAGE DISK)
IMAGE INPUT MEMORY INTERFACE CIRCUIT
2108
2104
DECODER
IMAGE MEMORY
2103
MULTI-PLEXER
2107
2105
2101
COMPUTER NETWORK
PRINTER
I/O INTERFACE CIRCUIT
IMAGE GENERATION CIRCUIT
DRIVING CIRCUIT
2100
DISPLAY PANEL
2106
CPU
DISPLAY PANEL CONTROLLER
2102
2114
INPUT PORTION (KEYBOARD, MOUSE, ETC.)

FIG. 27

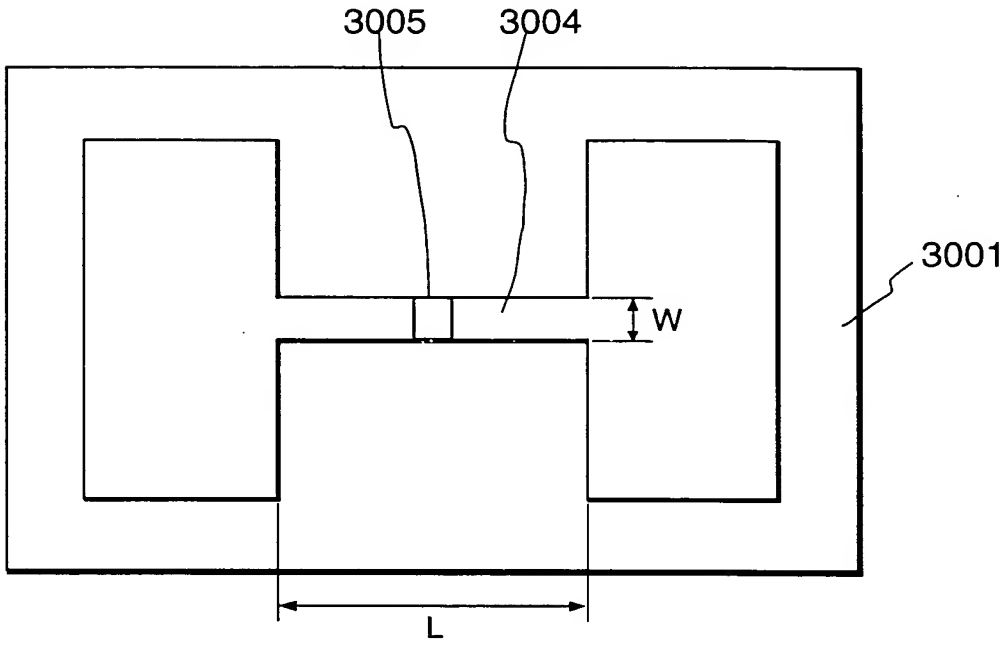


FIG. 28

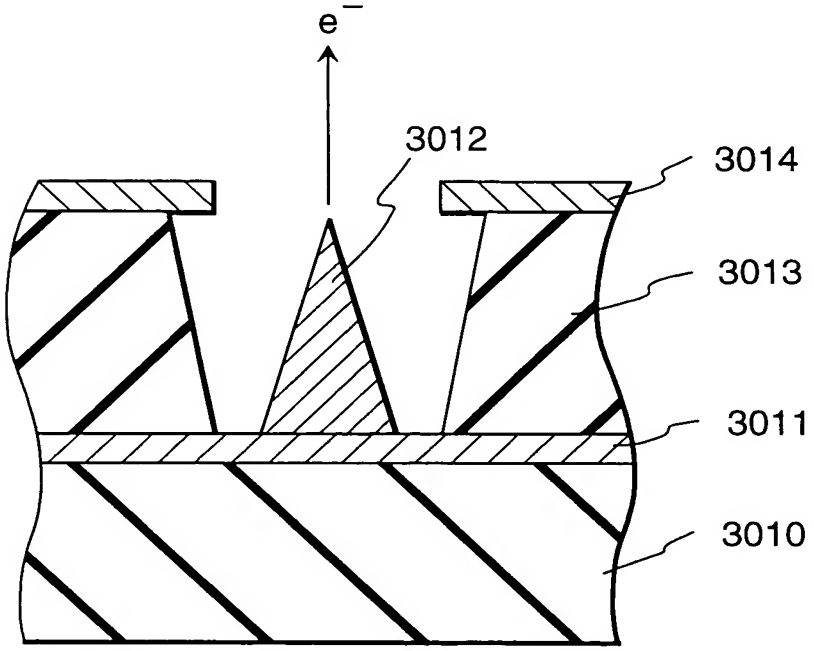


FIG. 29

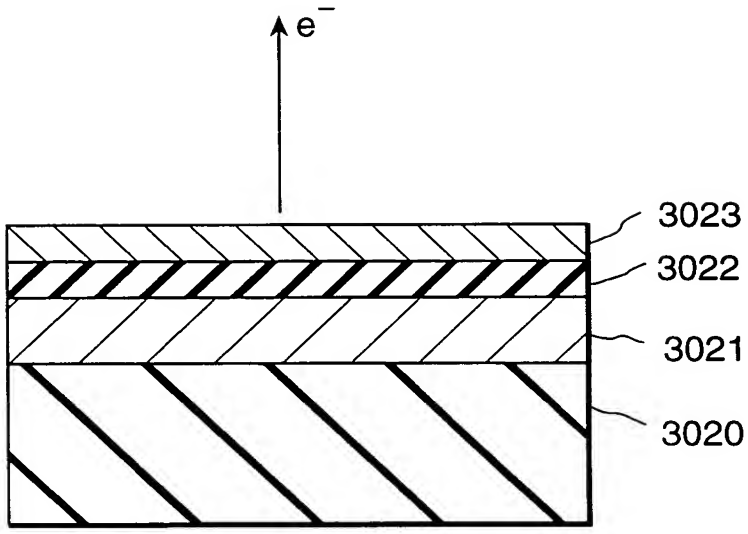


FIG. 30

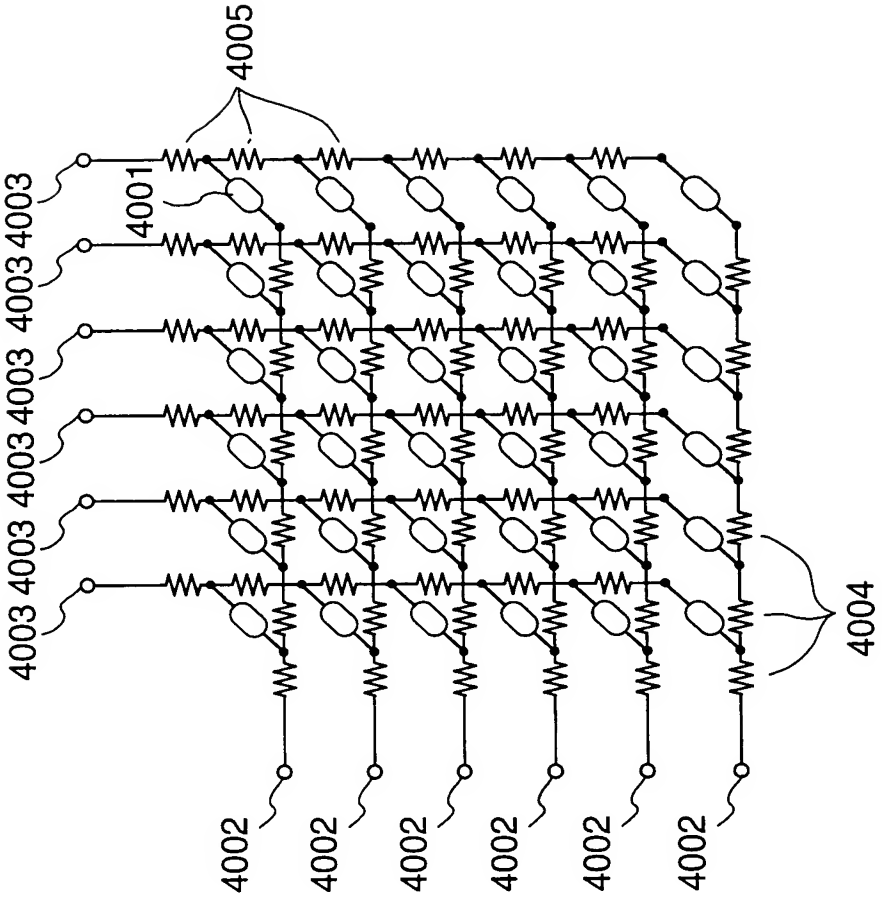

4005
4001
4003
4003
4003
4003
4003
4003
4004
4002
4002
4002
4002
4002
4002

FIG. 31

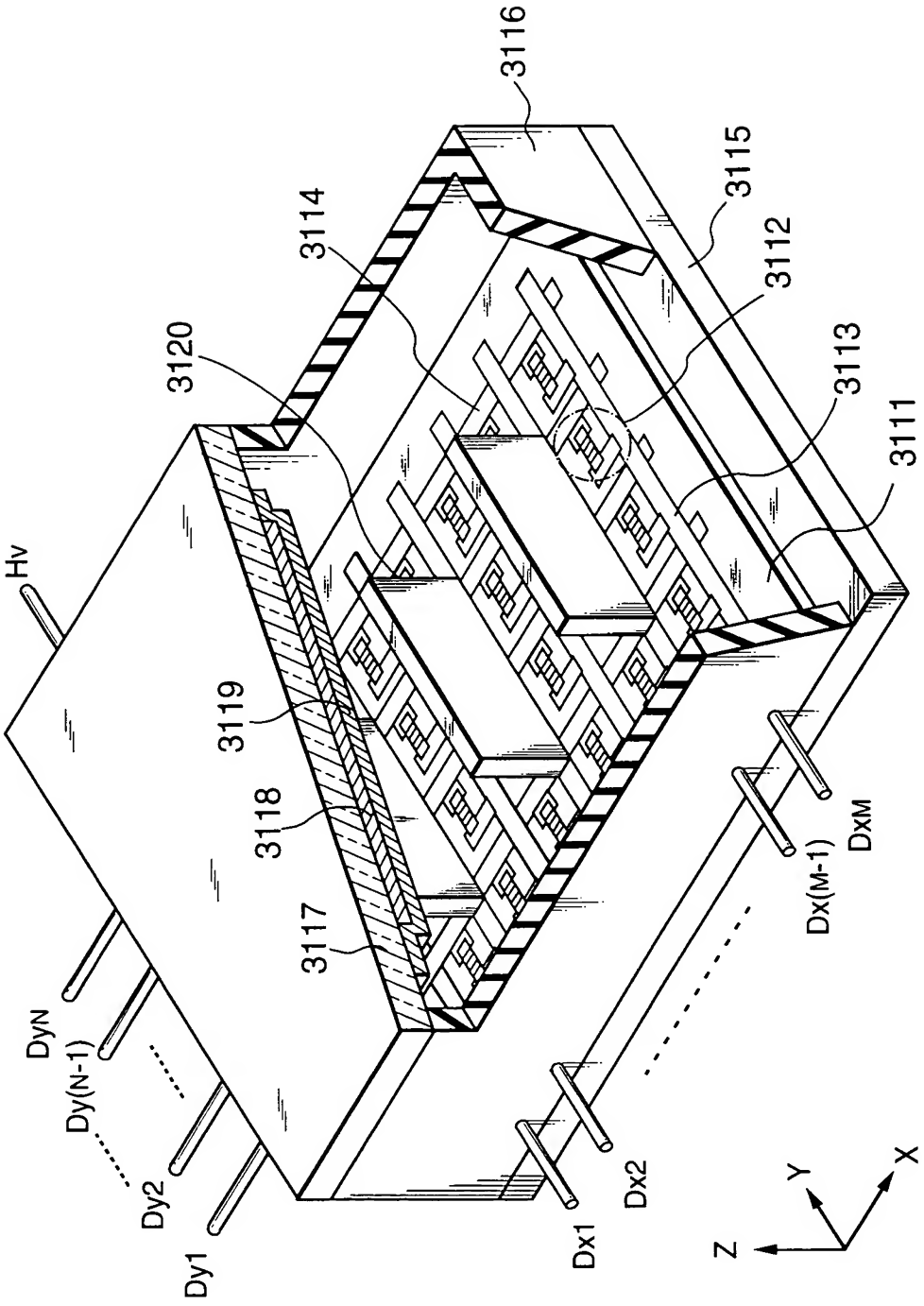

3116
3115
3114
3112
3120
3113
3111
Hv
3119
3118
3117
DyN
Dy(N-1)
Dy2
Dy1
Dx1
Dx2
Dx(M-1)
DxM
Z
Y
X

FIG. 32

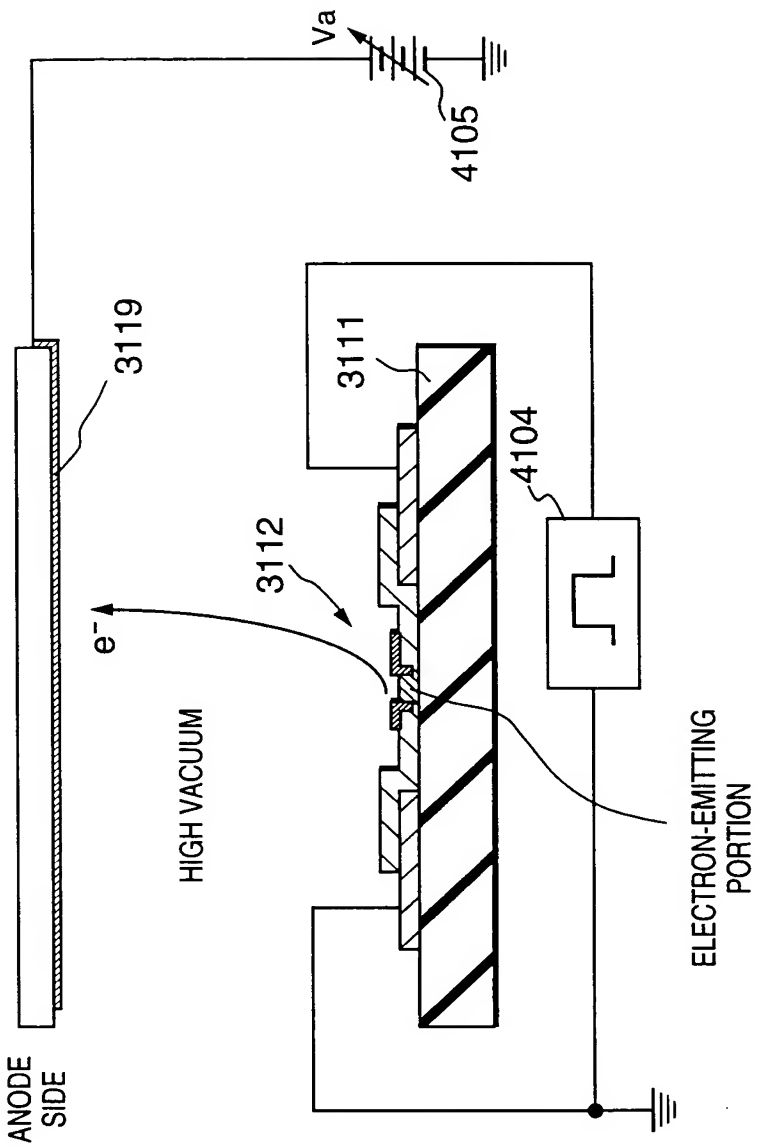

Va
4105
3119
3111
4104
3112
e⁻
HIGH VACUUM
ANODE SIDE
ELECTRON-EMITTING PORTION

FIG. 33

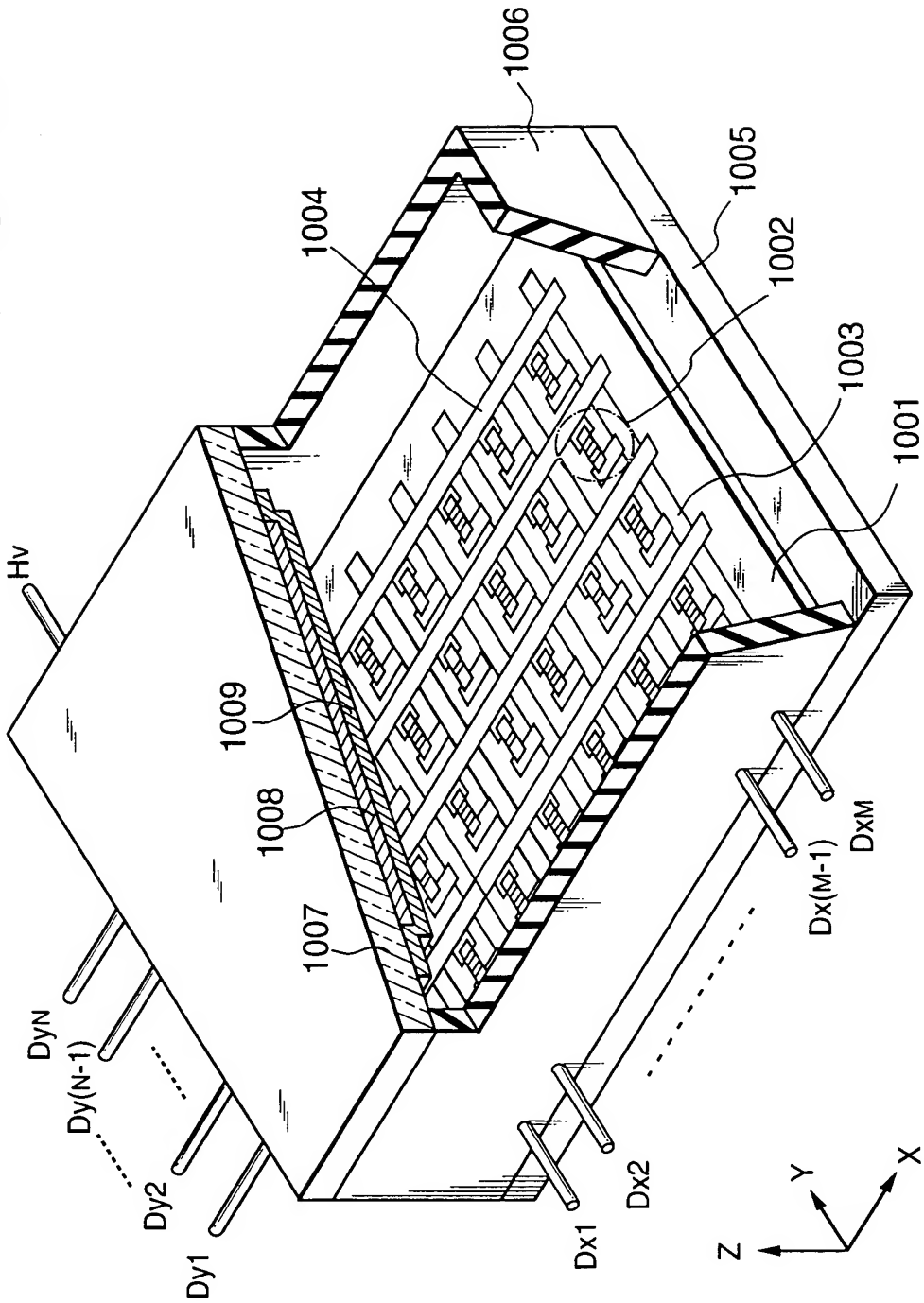

1006
1004
1005
1002
1003
1001
Hv
1009
1008
1007
DyN
Dy(N-1)
Dy2
Dy1
Dx1
Dx2
Dx(M-1)
DxM
Z
Y
X

FIG. 34

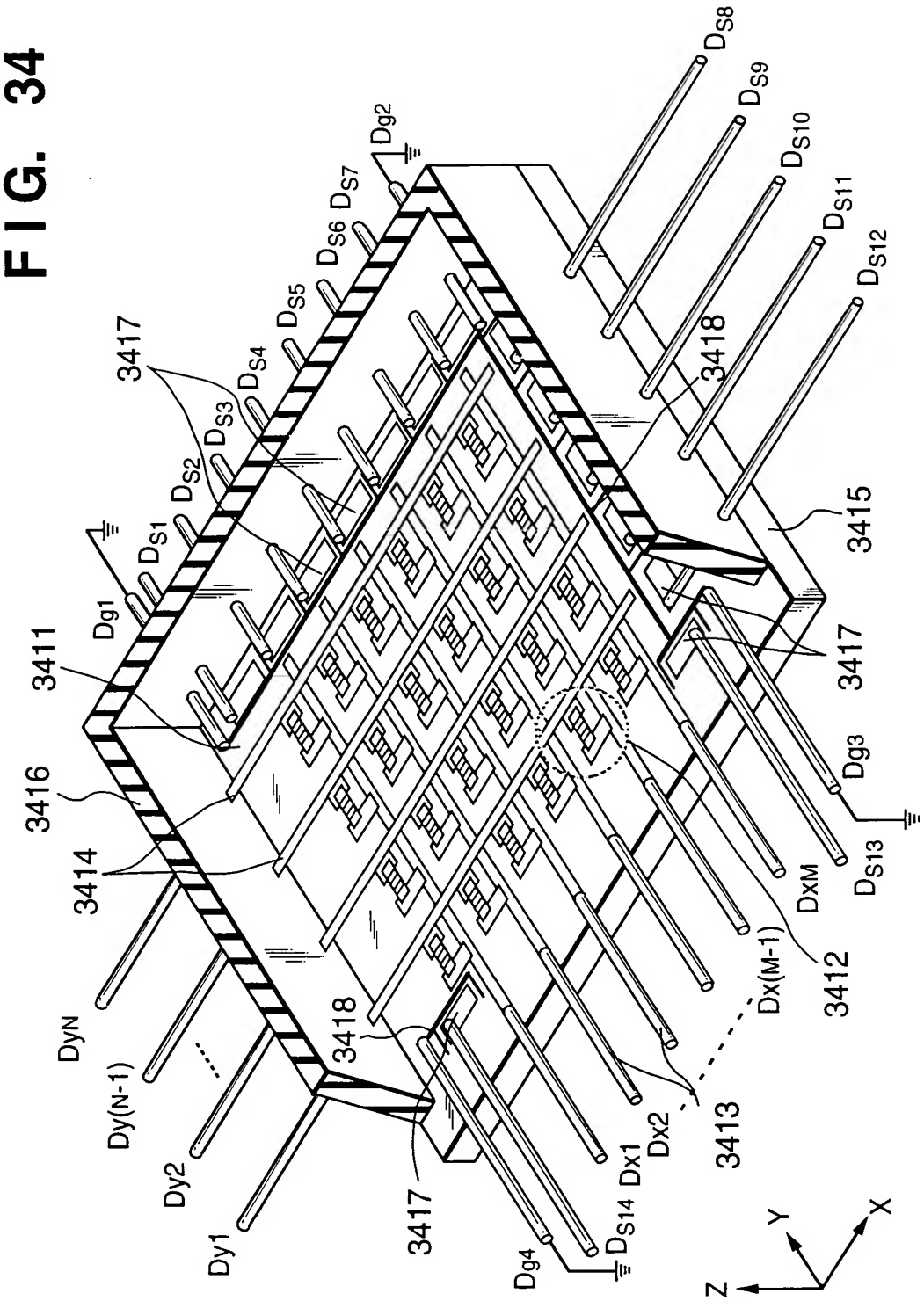

3411
3412
3413
3414
3415
3416
3417
3418
Dg1
Dg2
Dg3
Dg4
DS1
DS2
DS3
DS4
DS5
DS6
DS7
DS8
DS9
DS10
DS11
DS12
DS13
DS14
DyN
Dy(N-1)
Dy2
Dy1
Dx1
Dx2
Dx(M-1)
DxM
Z
Y
X

FIG. 35

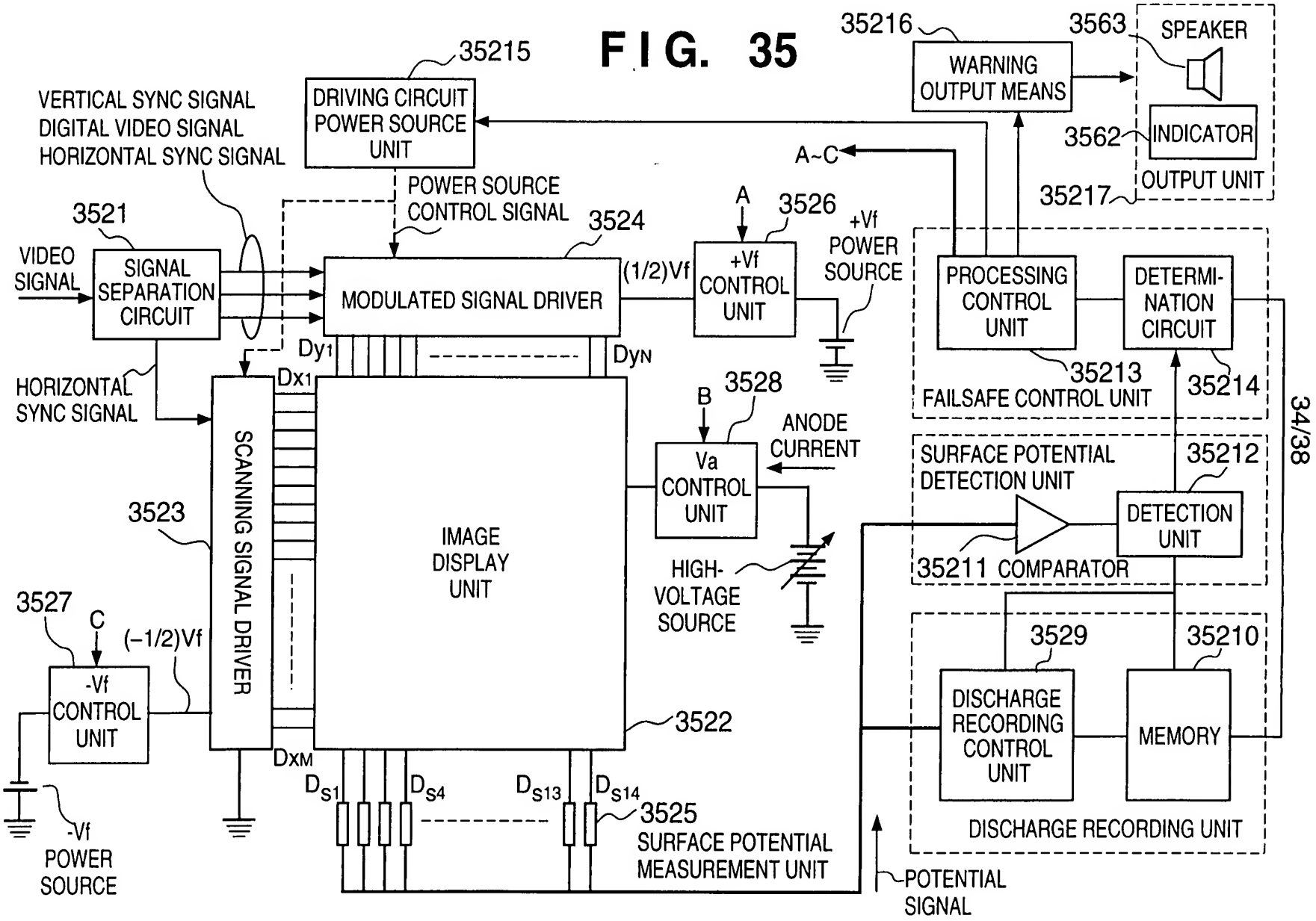

35216
3563
SPEAKER
35215
WARNING OUTPUT MEANS
VERTICAL SYNC SIGNAL
DIGITAL VIDEO SIGNAL
HORIZONTAL SYNC SIGNAL
DRIVING CIRCUIT POWER SOURCE UNIT
3562
INDICATOR
OUTPUT UNIT
A~C
35217
POWER SOURCE CONTROL SIGNAL
3521
3524
A
3526
+Vf POWER SOURCE
VIDEO SIGNAL
SIGNAL SEPARATION CIRCUIT
MODULATED SIGNAL DRIVER
(1/2)Vf
+Vf CONTROL UNIT
PROCESSING CONTROL UNIT
DETERMI-NATION CIRCUIT
Dy1
DyN
Dx1
35213
35214
FAILSAFE CONTROL UNIT
HORIZONTAL SYNC SIGNAL
B
3528
ANODE CURRENT
SURFACE POTENTIAL DETECTION UNIT
35212
SCANNING SIGNAL DRIVER
Va CONTROL UNIT
3523
IMAGE DISPLAY UNIT
DETECTION UNIT
HIGH-VOLTAGE SOURCE
35211 COMPARATOR
3527
C
(−1/2)Vf
3529
35210
-Vf CONTROL UNIT
DISCHARGE RECORDING CONTROL UNIT
MEMORY
3522
DxM
DS1
DS4
DS13
DS14
3525
-Vf POWER SOURCE
SURFACE POTENTIAL MEASUREMENT UNIT
DISCHARGE RECORDING UNIT
POTENTIAL SIGNAL
34/38

FIG. 36

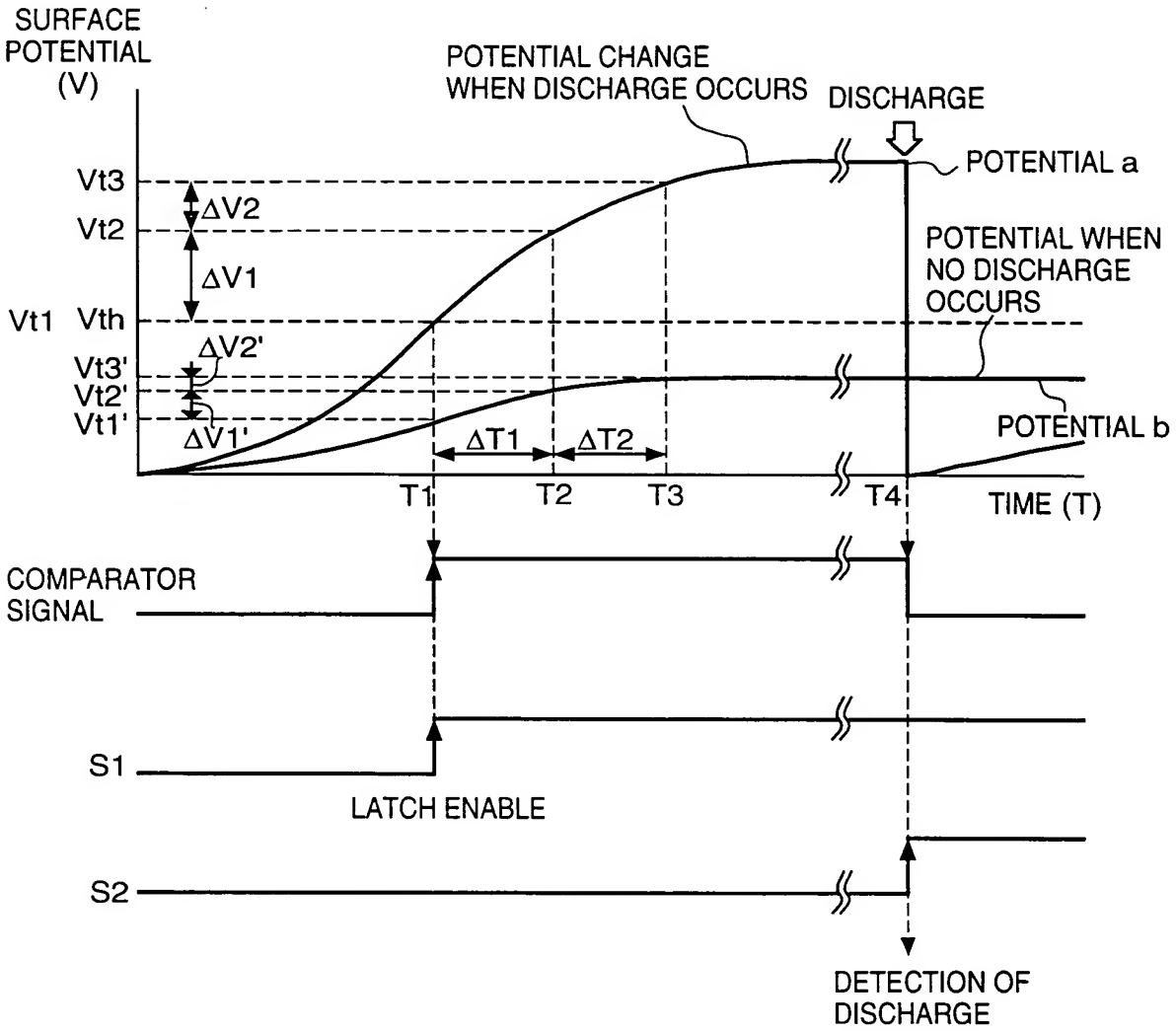

SURFACE POTENTIAL (V)
POTENTIAL CHANGE WHEN DISCHARGE OCCURS
DISCHARGE
POTENTIAL a
POTENTIAL WHEN NO DISCHARGE OCCURS
POTENTIAL b
Vt3
Vt2
Vt1
Vth
Vt3'
Vt2'
Vt1'
ΔV2
ΔV1
ΔV2'
ΔV1'
ΔT1
ΔT2
T1
T2
T3
T4
TIME (T)
COMPARATOR SIGNAL
S1
LATCH ENABLE
S2
DETECTION OF DISCHARGE

FIG. 37

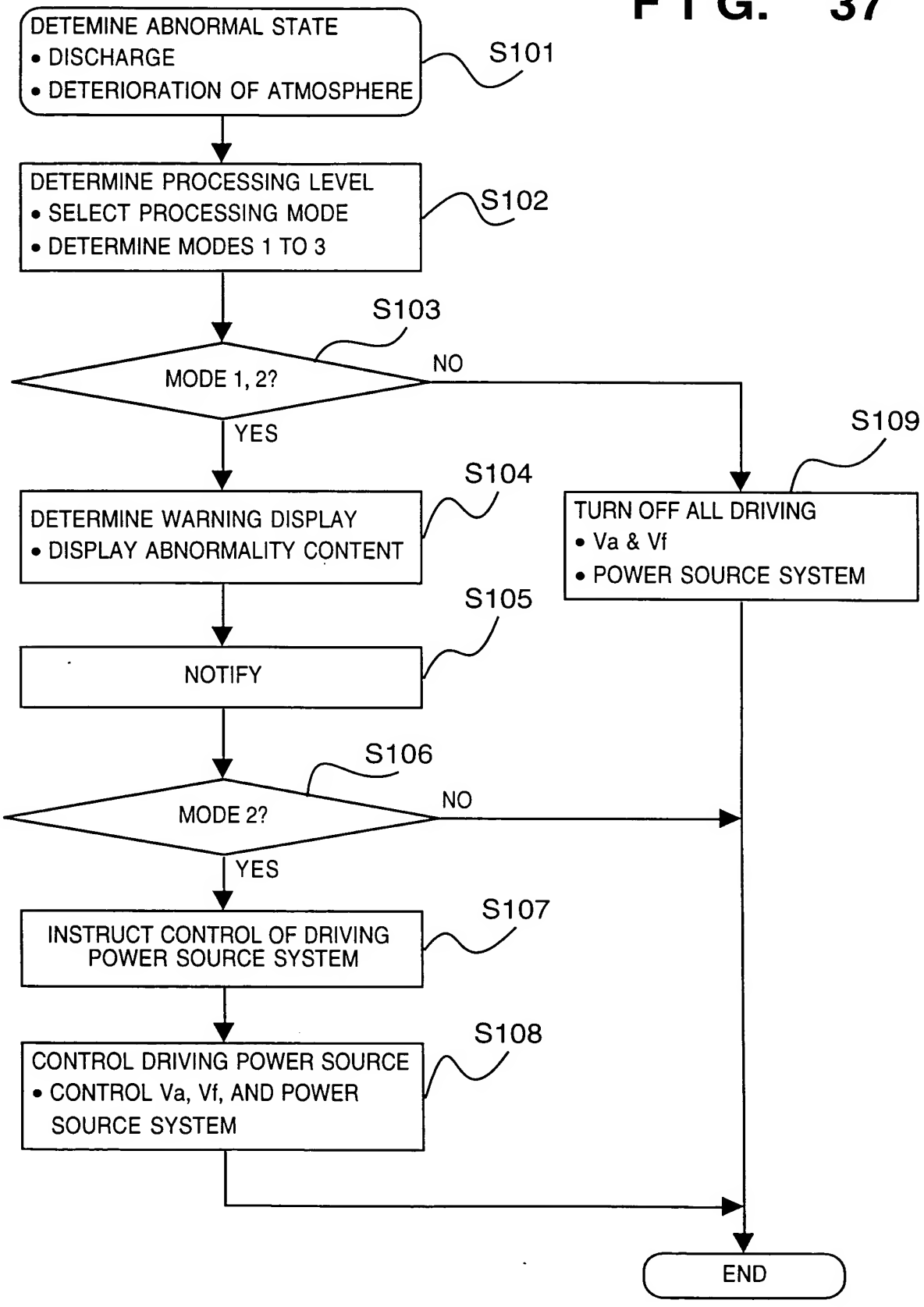

DETEMINE ABNORMAL STATE
• DISCHARGE
• DETERIORATION OF ATMOSPHERE
S101
DETERMINE PROCESSING LEVEL
• SELECT PROCESSING MODE
• DETERMINE MODES 1 TO 3
S102
S103
MODE 1, 2?
NO
YES
S109
TURN OFF ALL DRIVING
• Va & Vf
• POWER SOURCE SYSTEM
S104
DETERMINE WARNING DISPLAY
• DISPLAY ABNORMALITY CONTENT
S105
NOTIFY
S106
MODE 2?
NO
YES
S107
INSTRUCT CONTROL OF DRIVING POWER SOURCE SYSTEM
S108
CONTROL DRIVING POWER SOURCE
• CONTROL Va, Vf, AND POWER SOURCE SYSTEM
END

FIG. 38

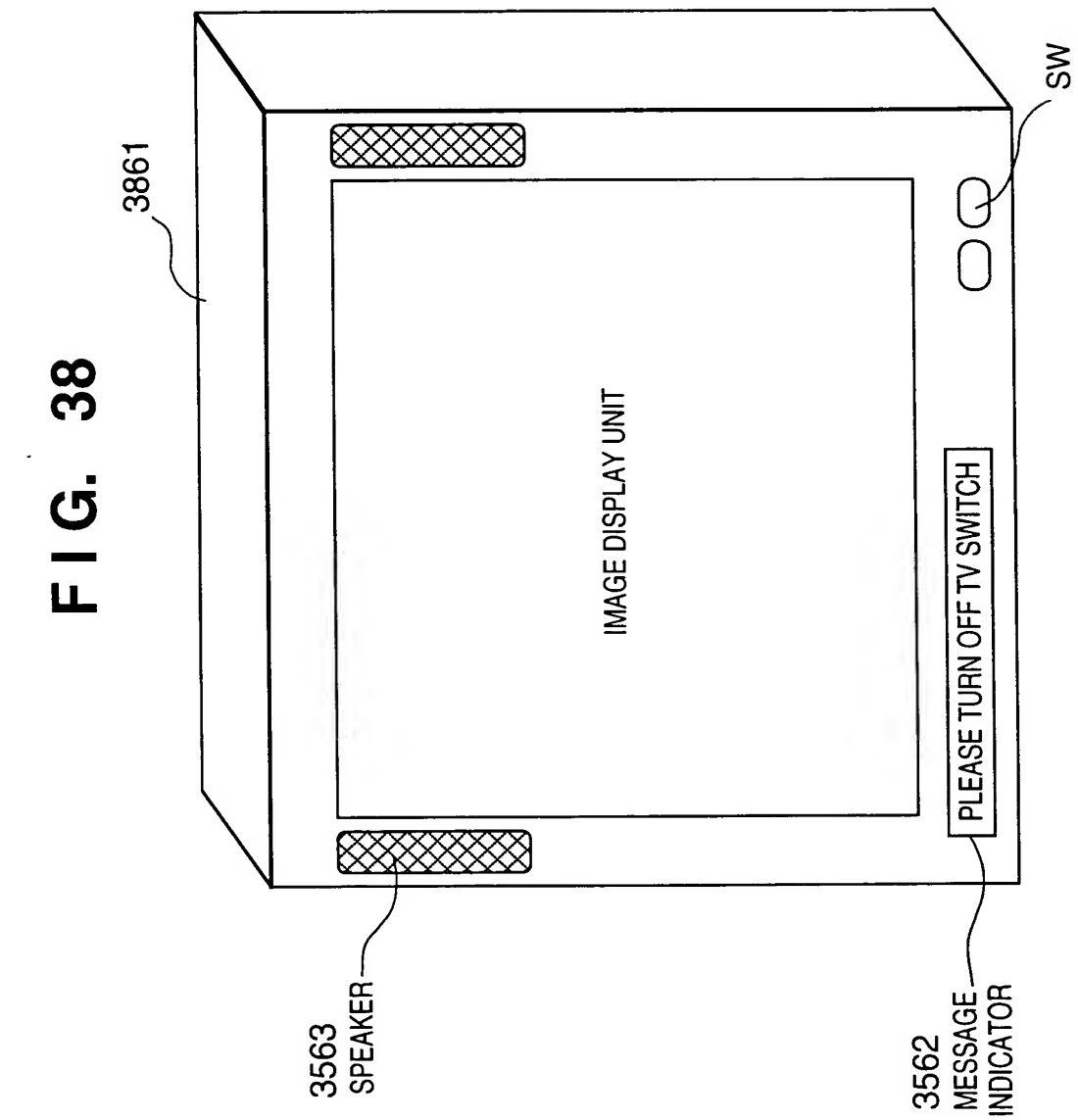
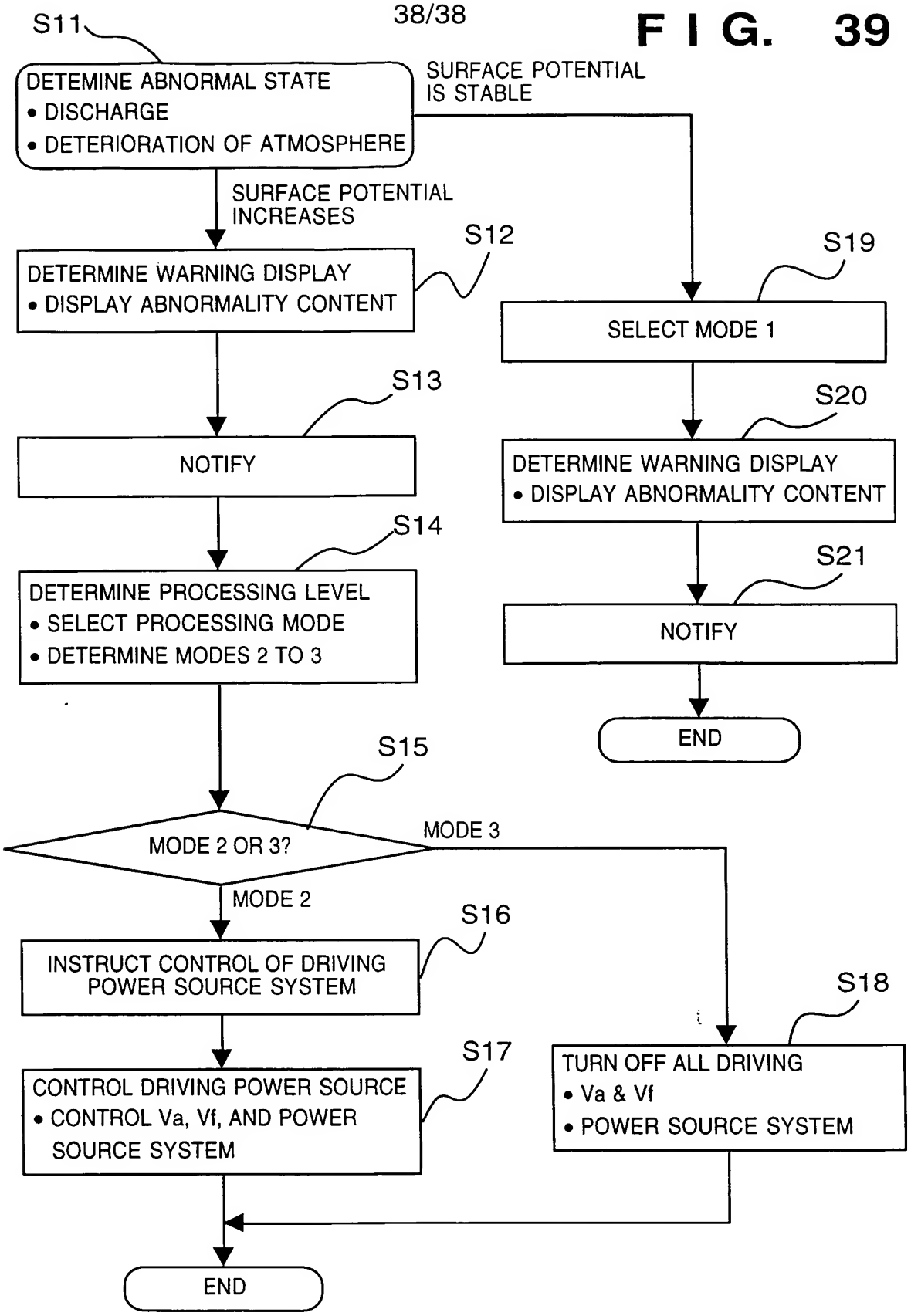

3861
SW
IMAGE DISPLAY UNIT
PLEASE TURN OFF TV SWITCH
3563
SPEAKER
3562
MESSAGE
INDICATOR

FIG. 39


S11
DETEMINE ABNORMAL STATE
• DISCHARGE
• DETERIORATION OF ATMOSPHERE
SURFACE POTENTIAL IS STABLE
SURFACE POTENTIAL INCREASES
S12
DETERMINE WARNING DISPLAY
• DISPLAY ABNORMALITY CONTENT
S19
SELECT MODE 1
S13
NOTIFY
S20
DETERMINE WARNING DISPLAY
• DISPLAY ABNORMALITY CONTENT
S14
DETERMINE PROCESSING LEVEL
• SELECT PROCESSING MODE
• DETERMINE MODES 2 TO 3
S21
NOTIFY
END
S15
MODE 2 OR 3?
MODE 3
MODE 2
S16
INSTRUCT CONTROL OF DRIVING POWER SOURCE SYSTEM
S18
TURN OFF ALL DRIVING
• Va & Vf
• POWER SOURCE SYSTEM
S17
CONTROL DRIVING POWER SOURCE
• CONTROL Va, Vf, AND POWER SOURCE SYSTEM
END